FOOD ENGINEERING

April 1953

A McGRAW-HILL PUBLICATION • FORMERLY FOOD INDUSTRIES

35 CENTS

PERFORMANCE is pinpointed on General Mills packaging lines. Here air-gap net weighing is charted. (Page 86)

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Use the Free
READER SERVICE

. . . for help on your job. It brings needed data on equipment, ingredients, supplies—also useful catalogs. As you read this issue, circle page numbers on

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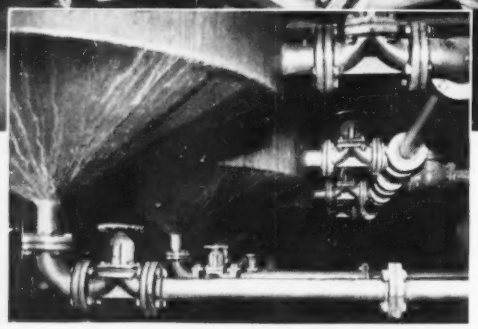
Found on the REALLY TOUGH JOBS

The most troublesome part of sewage treatment, a difficult service at best, is final disposal of sludge. Shown here in the Houston, Texas sludge disposal plant are two chain-wheel operated, 10-inch, rubber lined Grinnell-Saunders Valves, with neoprene diaphragms, handling filtrate from vacuum filters with a PH of 3.5 to 4. This filtrate is a 2% to 3% solution of Ferric Chloride on a 15" to 20" vacuum. Temperature is atmospheric.



◀ In same plant. Eight 3-inch rubber lined Grinnell-Saunders Diaphragm Valves, handling 8% to 10% Ferric Chloride, at atmospheric temperature

OPEN CLOSED

GRINNELL-SAUNDERS DIAPHRAGM VALVES

Streamlined flow. Smooth, streamlined passage, without pockets, prevents trapping of solids. Frictional resistance is at a minimum — regardless of direction of fluid flow. No disc holder in fluid stream.

Leak-tight closure against grit, scale, suspended solids. The resilient diaphragm, plus the large area of contact, gives leak-tight closure against pressure or vacuum.

Working parts absolutely isolated from fluid. Diaphragm completely seals off working parts from fluid in the line. No sticking, clogging or corroding of working parts. Valve lubricant cannot contaminate fluids.

Body, lining and diaphragm materials to meet service condition. Bodies stocked in cast iron, malleable iron, stainless steel, bronze and aluminum; other materials on special orders. Valve bodies lined with lead, glass, natural rubber or neoprene. Diaphragm materials of natural rubber or synthetics.

Minimum maintenance. No refacing or reseating is required. No packing glands to demand attention. New diaphragm can be inserted without removing valve body from the line.

GRINNELL

WHENEVER PIPING IS INVOLVED

Write for Grinnell-Saunders Diaphragm Valve Catalog

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
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industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

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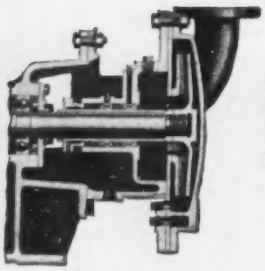
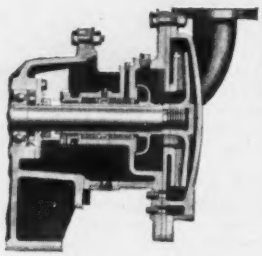


Standard Stuffing Box — for suction lift. Stuffing box on the suction side limits pressure on packing to suction pressure. Under suction lift conditions, the liquid being pumped does not enter the stuffing box.

ALLIS-CHALMERS

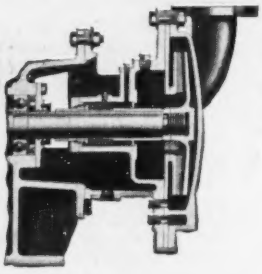
PROCESS PUMPS

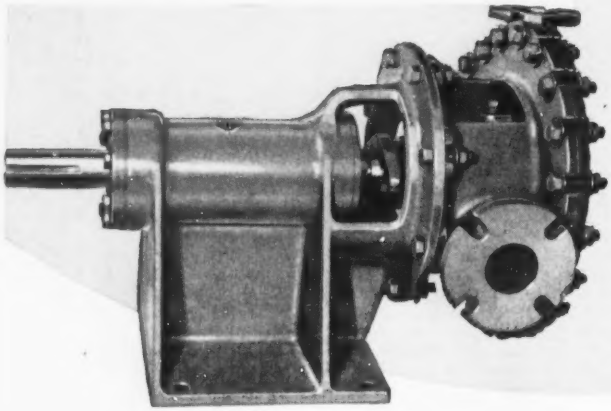
VERSATILITY that Cuts Your Pumping Costs



***Equiseal* Stuffing Box — for suction heads to 15 feet.** The *Equiseal* stuffing box is equipped with an auxiliary impeller which produces a low pressure area in front of the packing. This low pressure area prevents the liquid being pumped from entering the packing on suction heads up to 15 feet at 1750 rpm.

Mechanical Seal — for suction heads over 15 feet. The Allis-Chalmers Process Pump may be fitted with a variety of mechanical seals for conditions where the suction head exceeds 15 feet. Each application is individually engineered.





YOU CAN HANDLE A WIDE RANGE of products with one type of pump when it is an Allis-Chalmers Type P Process Pump. Each of the three sealing methods shown here is interchangeable on any Type P pump with a minimum of alteration to the pump itself. No new major parts or permanent alterations are required to use any of these sealing methods.

CHOICE OF MATERIALS

The Allis-Chalmers Process Pump is available in a wide choice of materials to handle many combinations of abrasiveness and corrosiveness in the liquid to be pumped. Usual materials include aluminum bronze, *Ni-Resist*, 316 stainless steel, and 18% chrome steel, plus almost any special material which may be required, including non-machinable alloys. Parts subject to varying rates of wear are separated for easy replacement.

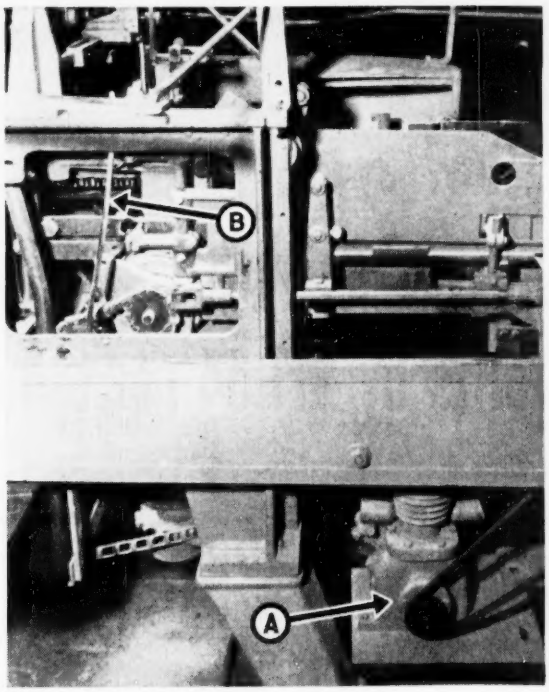
GET DETAILS

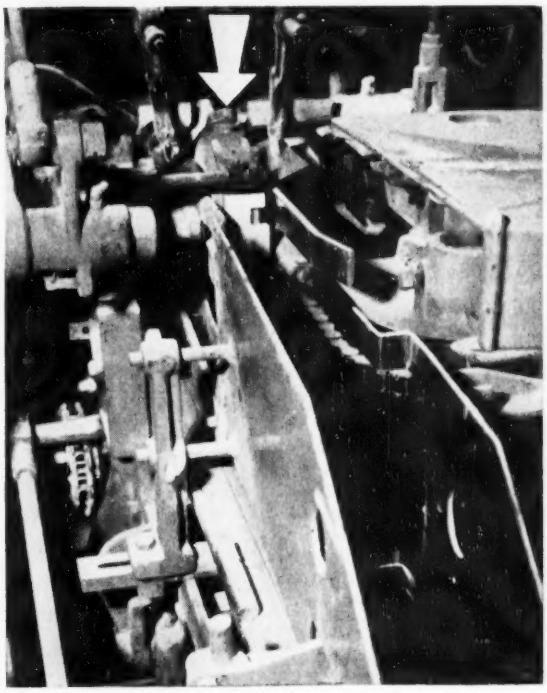
For complete details on the Allis-Chalmers Process Pump plus competent engineering assistance, call your nearby Allis-Chalmers District Office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin for Bulletin 52B6615. A-3902

Equiseal is an Allis-Chalmers trademark.

ALLIS-CHALMERS

PRACTICAL IDEAS





Air Blast Aids Carton Glueing

A starch-like film of our milled product, Cream of Rice, dusted on carton flaps during filling often prevented adequate glueing of the flaps, until we improvised a method of blowing them dust free.

Equipment used for this operation was readily obtainable and easily installed.

First, a source of air delivered in uniform volume and pressure was installed. Selected was a compressor–(A) in left photo–formerly used for refrigerant compressing in household mechanical refrigerator. Belt-connected with one of the closing machine's shafts, compressor provides air output that is uniform with movement of boxes through gluer.

Through copper tubing (B) air is piped to carton-flap tucking-station (right photo arrow). Here outlet of tube is positioned so that a stream of air is directed on top of the two short end-flaps after they have been folded. Pressure of air blast, which also cleans long side flaps, can be regulated by size and shape of outlet orifice.

Adhesive bond is much improved now that flaps are dust free.—*D. C. Cornell, Cream of Rice Superintendent, Grocery Store Products Co., West Chester, Pa.*

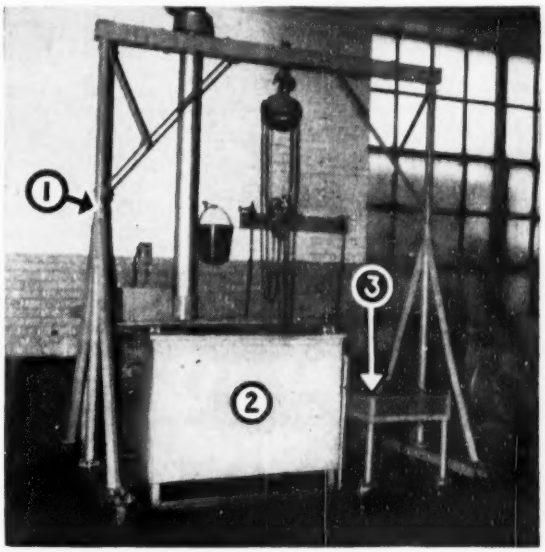
Cleaning Eased by Mobile Crane

Mounted on castors and equipped with a hand hoist, our homemade engine transporter has simplified and speeded the soaking of truck engines and other heavy auto parts in hot caustic solution for cleaning.

Locating a bulky caustic-wash tank in the dismantling and repair section of the shop would have caused congestion, and also increased the hazard of accidents. And locating the cleaning operation at a distance from the dismantling operations, created a difficult time-labor consuming problem, until solved by the mobile crane.

This contrivance—(1) in photo—constructed of pipe and angle iron wide enough to span the front end of a truck, provides a quick and handy means of lifting engines free of vehicles. Assembly is then readily pushed to the soaking tank (2) where the engine is caustic-washed.

When the hot caustic treatment is completed, hoisted engine is transported to a floor drain, over which it is hosed. Smaller parts are shifted from the tank to an expanded-metal basket-on-wheels (3) in which they likewise are trucked to a floor drain for hosing.—*James Owens, Fleet Manager, Abbotts Dairies, Inc., Philadelphia.*

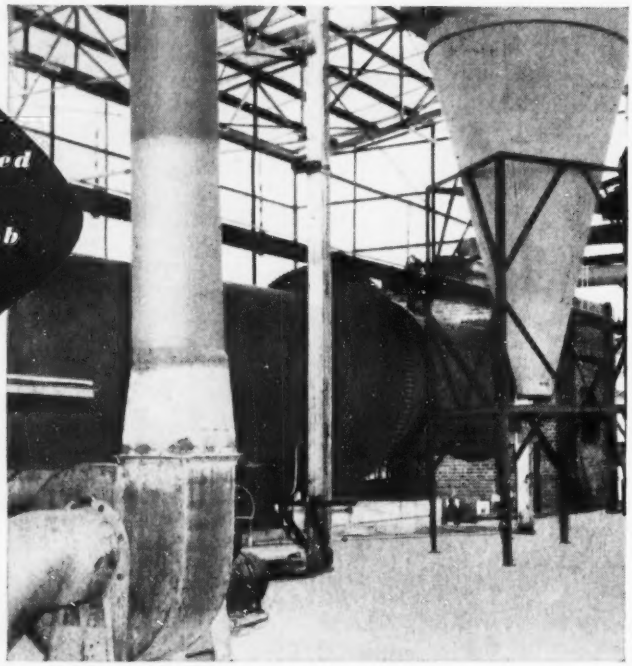


See Louisville for

CREATIVE DRYING ENGINEERING

How a new Louisville Dryer can lift production by 4½ times...profits by $11.54 per ton

Designed to do your job best!



FORMER DRYER

Installed cost	$9,000.00
Annual production (tons)	450
Drying cost per ton	$18.60
Capacity, lbs. dried product per hour	600

LOUISVILLE DRYER

Installed cost	$36,000.00
Annual production (tons)	2,625
Drying cost per ton	$7.06
Capacity, lbs. dried product per hour	3,500

EXTRA PROFIT PER TON DRIED WITH LOUISVILLE DRYER $11.54

Don't call in a "boy"—when the job is man-size! Small-production dryers *can* cost you big money—as the performance comparison figures shown here prove clearly. Here's black-and-white proof that it pays to have a Louisville engineer check over your dryer capacity.

A study of your problem may show that a larger-capacity Louisville dryer—especially designed for your purpose—will turn out 4½ times more production—with little if any increase in your labor costs. In fact, labor savings alone may spell the difference between a good profit or a sagging loss.

Find out what a specially designed Louisville dryer—with output pretested in our own unique laboratory and pilot plant—will do for you. Ask for a Louisville survey of your problem. There is no obligation.

Other General American Equipment:
Turbo-Mixers, Evaporators, Thickeners, Dewaterers, Towers, Tanks, Bins, Filters, Pressure Vessels

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

Louisville Drying Machinery Unit

Over 50 years of creative drying engineering

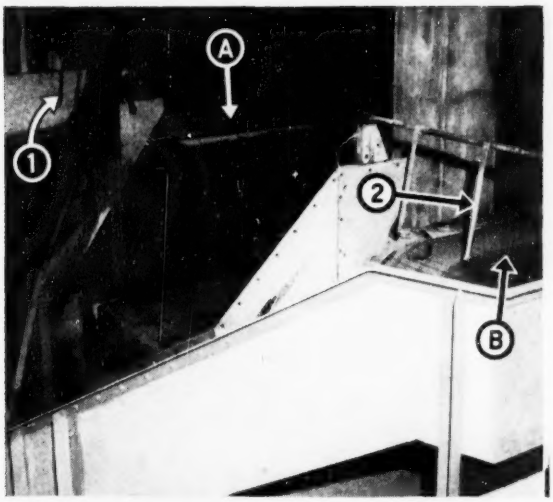
GENERAL AMERICAN TRANSPORTATION CORPORATION

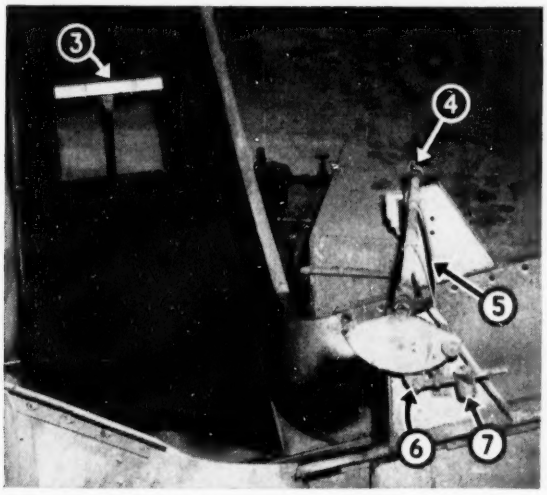
Dryer Sales Office: Hoffman Bldg., 139 So. Fourth Street Louisville 2, Kentucky

General Offices: 135 South La Salle Street, Chicago 90, Illinois

Offices in all principal cities

For more information, use coupon on page 213.





Two Feeds to One Conveyor—No Clogging

Since installing a neat system of controls it is no longer necessary for us to provide manual supervision over discharge from two conveyors which converge by chute to feed a single conveyor.

Purpose of the control system and how it works follows:

After washing and drying, empty bags are put in bales which pass through a high frequency sterilizer on two slow-moving, woven-wire conveyors—(A and B) in top photo. Chutes, into which conveyors discharge, converge to feed a single transporting unit supplying clean sterile bags to plant or bag warehouse. If bales are discharged from both feed conveyors simultaneously, they wedge at junction of the two chutes—causing a pile-up of following bales.

To prevent this congestion, controls (1 and 2) were located at the discharge ends of the feed conveyors. Now, a bale leaving feed conveyor (A, for example), lifts fingers on control (1). This closes the electric circuit which operates mechanism lifting the hinged platform—(3) in second photo. Thus, a bale coming from conveyor (B) will be temporarily halted.

When bale from feed conveyor (A) is picked up by plant conveyor, bale immediately operates control (4), which lowers the stop (3), allowing bale from conveyor (B) to continue down chute to plant conveyor.

Movement of fingers (5) which operate controls located on plant conveyor, must be limited. If the return swing is free, fingers may pivot too far and engage the next bale —resulting in bent fingers and damaged controls.

Return of fingers is governed by brake (6), which is regulated to correct tension by counterweight (7).—*A. F. Wenske, Assistant Superintendent of Maintenance, Eastern States Farmers Exchange, Buffalo.*

$50 Extra for Best Item

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

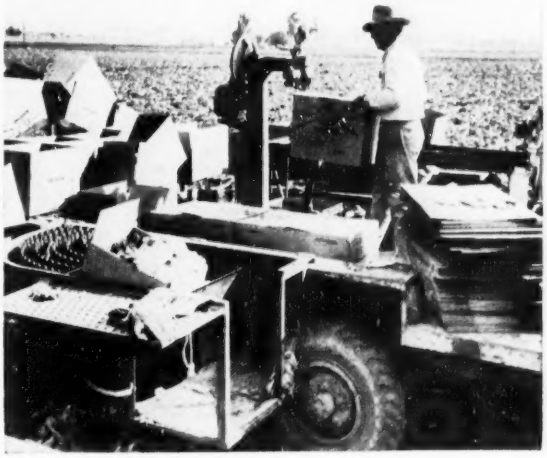
Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finshed drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

FEBRUARY PRACTICAL IDEA voted best was "Proportioner for Mixed Vegetables," submitted by Albert Schuchardt, Country Gardens, Inc., Coleman, Wis. Described was a machine that mixes vegetable products in accurate ratio by means of a series of hopper-fed screw conveyors that are chain gear driven at varying speeds.



Mobile Stitcher Aids Field Packing

Since the advent of vacuum cooling of leafy vegetables, top-icing of crated products in reefers is avoided. Therefore lettuce heads and similar products can now be packaged in corrugated or fiberboard shipping cases in the field.

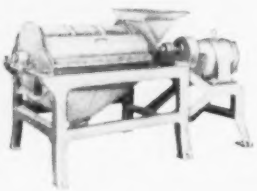
Though this procedure introduced savings in both crat-

Keep Product Quality Up- Production Costs Down

FMC specialized tomato equipment helps build profits for processors three important ways: (1) it *cuts costs* of operation and maintenance throughout the line by using continuous automatic methods; (2) it's *flexible* —types and sizes available to meet varying plant and operational requirements; and (3) it assures a consistently *high-quality* pack of tomatoes, tomato juice and other tomato products.

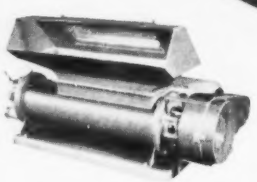
Write for full information, or call your nearest FMC representative.

—with fmc TOMATO PREPARATION AND PROCESSING EQUIPMENT



FMC PULPERS and FINISHERS

Heavy duty stainless steel paddles and screens. Capacities: Pulpers, 5 to 20 tons per hr. Finishers 20 to 100 GPM.



FMC TOMATO CHOPPER

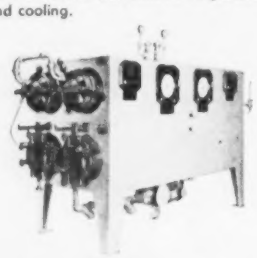
Delivers small uniformly chopped product at 25 tons per hr. Table-level height eliminates feed elevators.

FMC HAND PACK FILLER

Sturdy, stainless top. Gear head motor or packaged variable speed drive for economical, timed operation.

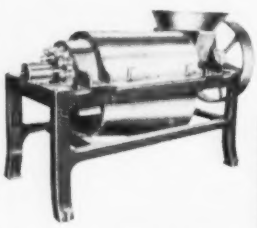
FMC JUICE PROCESSOR

Continuous preheating, pasteurizing, holding and cooling on one base. Capacities: 20-70 GPM. Other units for single heating and cooling.



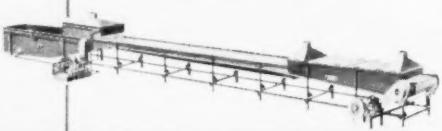
FMC JUICE EXTRACTORS

Large screen, extra long screw and extraction area for capacities up to 75 GPM. Lower capacity models available.



FMC TOMATO LINES

Thorough washing, sorting and scalding on a continuous conveyor. Available in high or low pressure water systems.



OTHER *fmc* TOMATO EQUIPMENT

- Washers (Flood-type and rotary)
- Peeling and Inspection Tables
- Scalders
- Fillers (Juices, pastes, solids)
- Heating coils

FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Division

General Sales Offices:

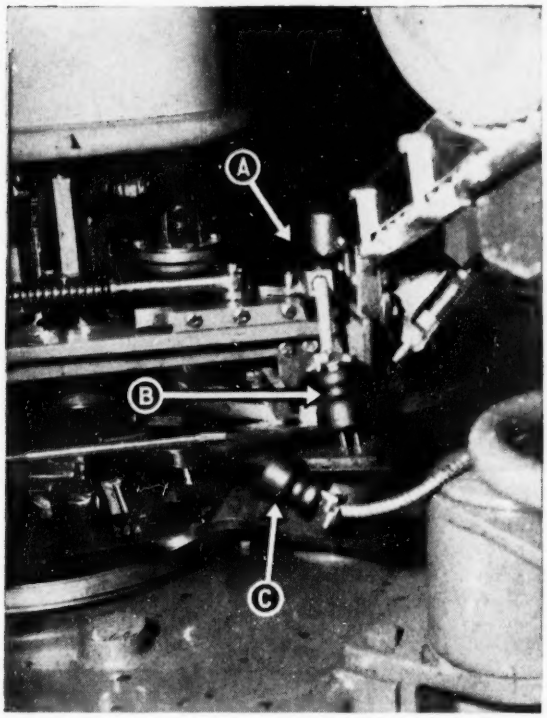
WESTERN: SAN JOSE 6, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS

For more information, use coupon on page 213.

ing and car-icing costs, full advantages of improved system could not be realized as long as it was necessary to truck assembled empty cartons to the field.

Problem was solved when J. W. Martin & Sons mounted an Acme carton stitcher driven by a 1-hp. gasoline engine on a truck bed so cases could be fabricated in the field (see photo).

Final step in improved procedure was to add folding extensions to sides of truck, providing mobile equipment for completing field packaging as well as forming carton.—*FE Staff.*



Interchange of Cap-Coders Speeded

Installation of male and female plugs on the electrical circuit to our cap coder has made it possible to shift from any one to any other of our six code groupings with minimum loss of production time.

Formerly, when change of cap-liner marking was to be made, coding device assembly—(A) in photo—was unscrewed and removed. Code was loosened and taken from case and new code inserted and locked. Then assembly was reinstated in proper location.

Entire coding device remianed attached to electric wires during this sequence of operation—with these complications: Time required for code changing was excessive, causing great loss of production time. Also, if an error was made in code arrangement, requiring repetition of change cycle, time lost was more than double.

Now, each code is permanently set and locked in its own assembly, from which wires lead to a male electric plug (B), which can be attached quickly to the live female plug (C).

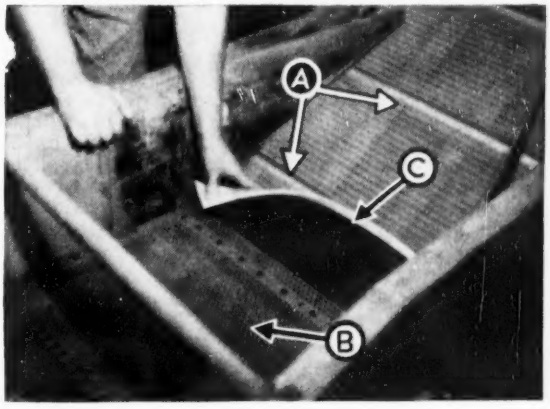
Changeover is rapid with this procedure. Electric circuit is broken by separating the plugs, then assembly in use is removed by unscrewing a bolt. Replacement assembly is as quickly hooked up.—*A. P. Bullotta, Kitchen Bouquet Sauce Superintendent, Grocery Store Products Co., West Chester, Pa.*

Hardwood Floors Waterproofed

When the most logical location for a new, though possibly temporary, lima bean washing line was in a recreation room with polished hardwood floors, a difficult dilemma arose.

If another location were chosen, costly construction would be required. Yet appropriation of this recreation room meant the floor would certainly be damaged or even ruined—unless adequate protection from water and moisture could be provided.

Deciding on the recreation room, we found that covering the floor with heavy canvas thoroughly impregnated and coated with a rubber-base paint gave adequate protection. And after the season's use, this canvas could be removed, leaving no ill effects to polished hardwood floor. —*W. A. Free, Jr., Hungerford Packing Co., Hungerford, Pa.*



Belt Strip Prevents Product Loss

A piece of thick rubber belting, placed to cover discharge conveyor where it emerges from under the false bottom of our washer, has prevented costly produce loss.

Space between screening—(A) in photo—and conveyor flights (B) must be ample to prevent conveyor cross-members from hitting or binding against tanks false-

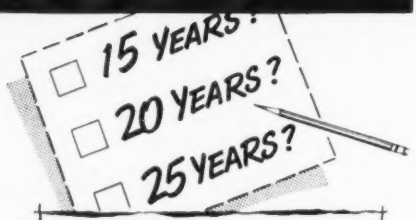
How old is the insulation in this cold storage room?

It's just about impossible to estimate correctly the age of a good insulation job. The corkboard on the walls of this cold storage room, for example, shows almost no signs of long service. Despite continuous operation the insulation is dry and free of frost. There's no bulging or buckling and it's still highly efficient. Yet, this corkboard was installed in 1928 — 25 years ago.

The Merchants Refrigerating Company warehouse in Newark, N. J., contains nine floors of cooler and freezer storage space. When the warehouse was built in 1928, these rooms were insulated with 722,000 board feet of Armstrong's Corkboard. Although the rooms have been in continuous operation for 25 years, the insulation has required no major replacements or repairs. It is still holding temperatures at surprisingly low refrigerating costs. In fact, it promises many more years of highly satisfactory service.

This case is by no means unusual. Our records show that hundreds of installations using Armstrong's Corkboard are today performing at peak efficiency after 20, 30, and even 40 years.

But it takes more than top-quality insulating materials to give long, low-cost service like this. The way those materials are installed can add years to their effectiveness, too. That's why it's a good idea to contact Armstrong whenever you're planning any low-temperature work. Armstrong's complete contracting organization can handle all phases of the job for you—from correct specifications to proper application. You get the kind of thoroughly professional job that means years of trouble-free service when Armstrong does your insulation work. For further information, just call your near-by Armstrong office or write Armstrong Cork Company, 2304 Concord Street, Lancaster, Pennsylvania.



Complete Insulation Contract Service

There are many factors that can't be written into an insulation contract, but which can largely determine whether or not the agreement will be entirely satisfactory. They include:

1. Financial responsibility—resources to complete the contract despite any unforeseen events.
2. Integrity—a reputation for quality work and for prompt settlement of any justified complaints.
3. Technical ability — experience, plus technical and research staff to do the job in accordance with best practices.
4. Manpower resources — trained supervisors and workmen able to handle any contract efficiently.
5. Efficiency — ability to deal with problems of accounting, tax provisions, insurance, and workmen's compensation.

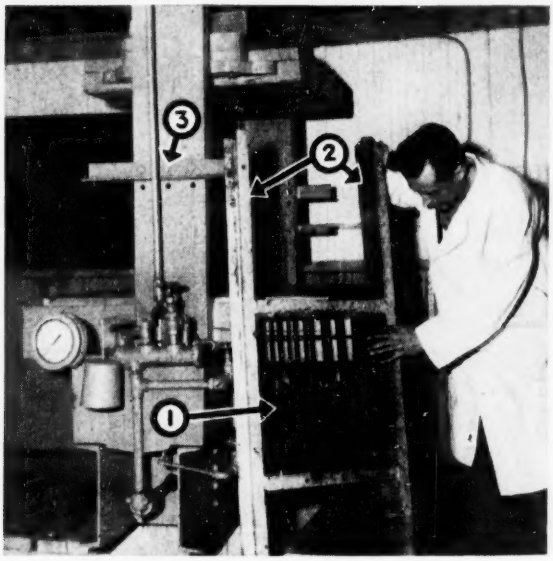
You get all these with an Armstrong Contract

ARMSTRONG'S INDUSTRIAL INSULATIONS

For temperatures from 300° below zero to 2800° F.

bottom. With angle iron flights an inch or more above the conveyor surface, the several inches of clearance between belt and screen permitted too much product to find its way to the true bottom of washer, there to become a loss.

Attaching a strip of "canner's belt" (C) to under side of the screen, so it rides on conveyor, closes gap through which product formerly escaped.—*L. M. Jordan and Dorsey Davis, Phillips Packing Co. Inc., Cambridge, Md.*



Speeds Fig Cutting

Breaking up compacted blocks of dried figs was a difficult and time-consuming chore before we designed a simple, hydraulic-press attachment. Latter has made it possible to cut the dried fruit quickly, after removal from container, and with little manual effort.

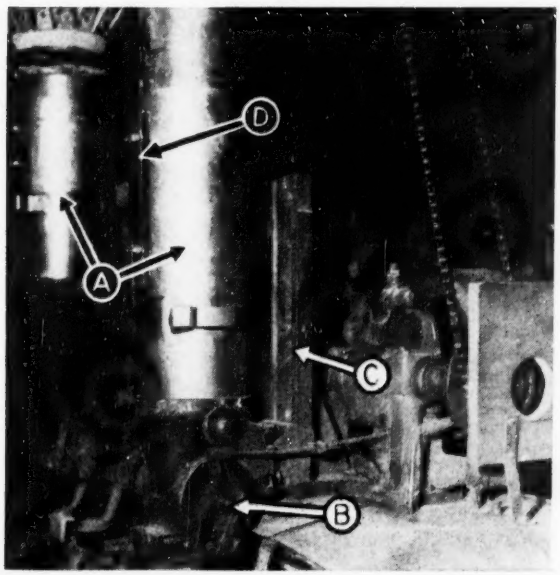
This is how the cutter is made, how it is attached, and how it operates:

Parallel steel-knife edges—(1) in left photo—were welded to make a cutting grid, which was mounted between two pieces of channel-iron (2) sufficient in length to open our hydraulic press.

About 1¼ ft. above the bed of the press, heavy angle-irons (3) were bolted to the press uprights. From these the cutting grid is suspended, held in place by bolts.

When figs are to be cut, grid is attached as shown in right photo. Next, the solid contents from a box of dried figs is placed on the press bed and positioned under the area covered by the knives. Then the press is started to raise the bed and thus force the dried fruit against the knives.

The desired fineness of cutting is obtained by shifting the position of the fig mass after each cutting operation. —*Robert Korn, Plant Engineer, Henry & Henry Inc., Buffalo.*



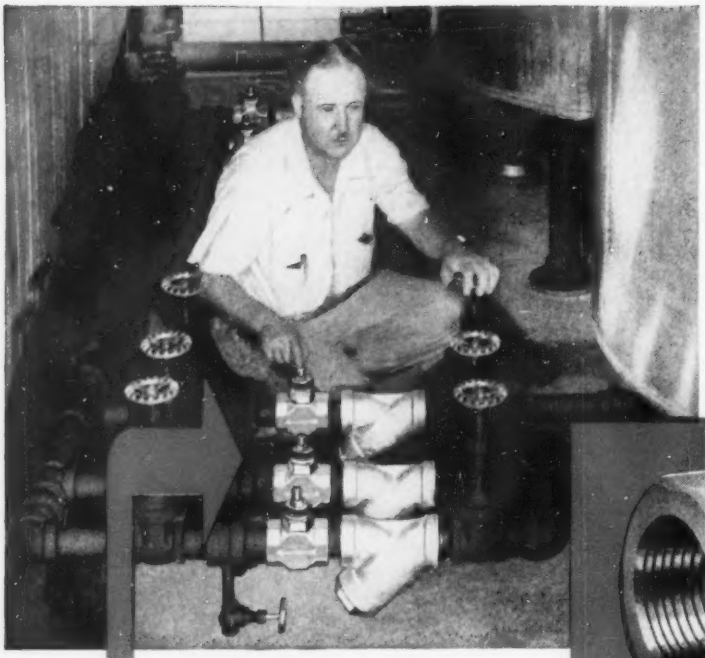
Sleeve Improves Filler Operation

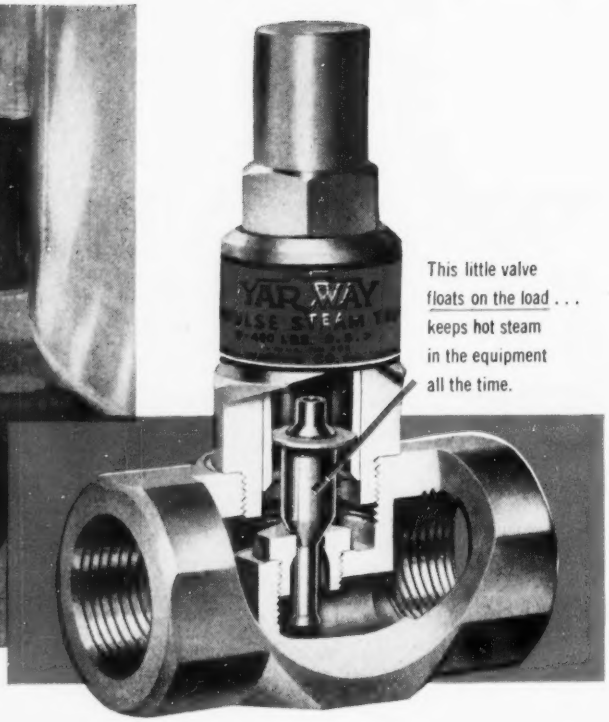
Performance of one of the filling machines at Stickney and Poor Spice Co., Cambridge, Mass., was smoothed when feed hopper and filling spouts were attached by outside sleeves—(A) in photo. Several marked mechanical advantages was gained.

Formerly telescoped ducts between hopper and filling head, stuck together so tightly, after such products as cream of tartar had been packaged, that they could be separated only by hammering or by similar means which injured the ducts. Cleaning became increasingly more difficult and likewise raising and lowering filling head (B) on its track (C) in order to accommodate varying sizes of packages.

Sleeve is merely a sheet of metal, near each vertical edge of which are riveted lengths of angle iron (D). As these latter are brought together by bolts, sleeve is tightened around ducts to form snug joints.

Removing the sleeve for cleaning machine or adjusting filling head requires no more than loosening bolts through the angle irons, sliding sleeve up on hopper spout and anchoring by tightening upper bolt.—*Russell F. Greenough, West Somerville, Mass.*





This little valve floats on the load . . . keeps hot steam in the equipment all the time.

THESE STEAM TRAPS GIVE FASTER HEAT-UP ON TOMATO COOKERS

PLUS 5 EXTRA BATCHES PER DAY!

RIPE tomatoes can't wait and they don't have to at the P.M.C. Canning Company, Swedesboro, New Jersey.

The owner of this large tomato and pizza sauce cannery found that by switching to YARWAY Impulse Steam Traps on his 1500 gallon cooking kettles, he was able to speed up the heat-up period enough to give *5 to 6 extra batches per day*. In addition, only with YARWAYS could high boiling temperatures be obtained quickly enough for proper pizza sauce processing.

That's because the little stainless steel valve (the only moving part in a YARWAY trap) opens wide when steam is turned on and discharges air and condensate *continuously* until production temperature is reached. After that, by a pulsating action, each tiny bit of condensate is discharged as it forms—maintaining steady, maximum temperature in the equipment.

This makes for profitable steam trapping. So do these other YARWAY advantages—low initial cost, low maintenance, stainless steel construction, easy close-quarter installation, quick availability from more than 200 local industrial distributors.

Try a YARWAY Impulse Trap FREE for 60 days in your plant. It's the best test. Your distributor will supply the trap. For his name, write . . .

YARNALL-WARING COMPANY
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YARWAY

the steam trap designed with more production in mind

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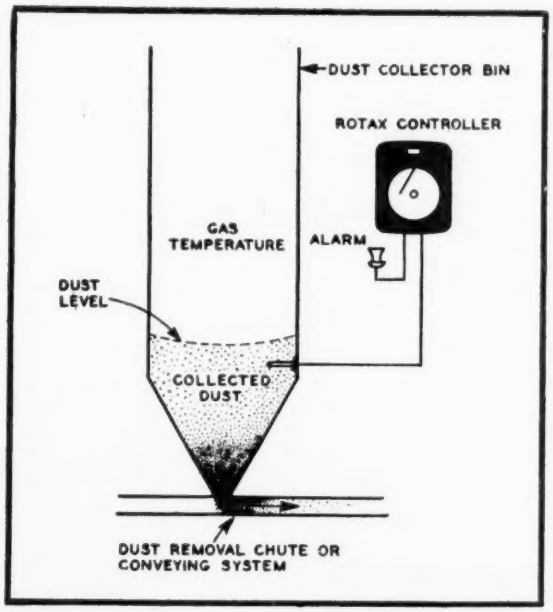
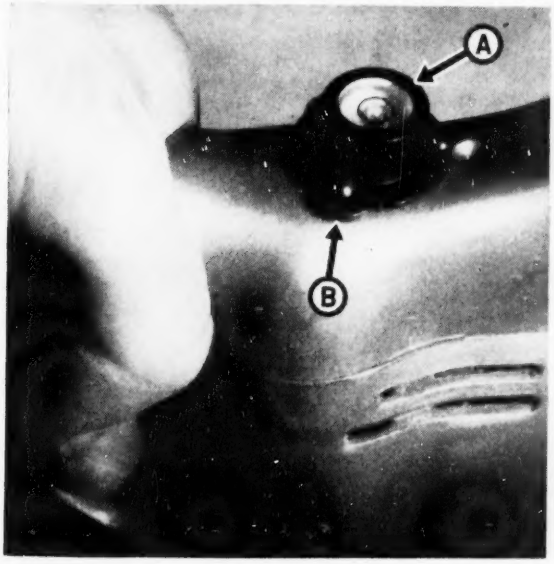


Controls Ash Level by Temperature

By locating Foxboro Rotex temperature controller at desired control level in a fly-ash collector, a system is installed which warns the operator or automatically empties the ash collecting bin, whenever it is filled over instrument height.

Mounted inside the collector, temperature bulb is inoperative at high temperatures of the flue gas. However, it closes an electrical circuit, sounding an alarm or starting the discharge mechanism, whenever the bulb is covered—thereby insulated by ash.

System might be applied to powdery foods dried in a hot gas.



Vertical Drill Holes Assured

A circular spirit-level attached to the base of a portable electric drill makes it possible to bore holes, overhead or near the floor, that are accurately vertical and not angled in any direction.

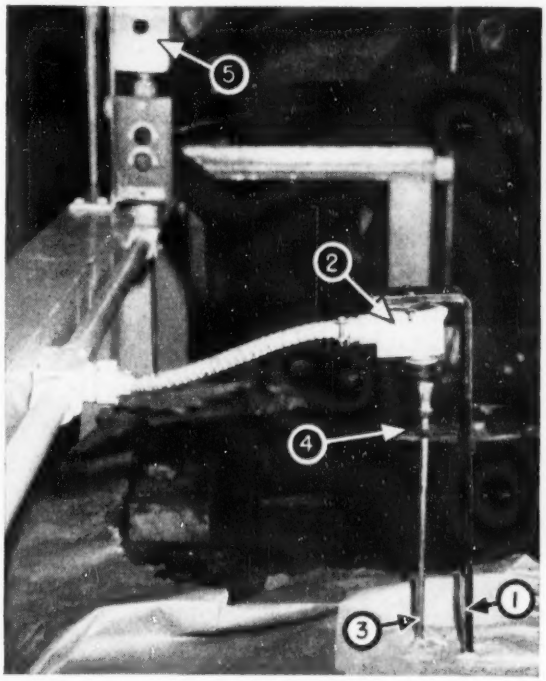
Usually, when drilling in these positions with other than a fixed-position press drill, it is difficult to hold tool so resultant hole is at right angles to surface.

The level employed—(A) in photo—can be procured at reasonable cost from a scientific instrument supplier or war-surplus dealer.

To secure it to tool housing, drill and tap three holes and attach with screws. Then align the level by erecting a drill rod in vertical position, holding rigidly in place by vice or clamps.

Now slip drill chuck over rod and tighten. By means of washers (B) between level and tool housing, level is adjusted until bubble is exactly centered. This may require filing or sanding some washers.

When bubble is maintained in center position when drilling up or down, resulting hole will be exactly vertical.—*Clifford T. Bower, London, England.*



Control Prevents Tank Overflow

Assembly made with a micro-switch, floats attached rigidly to a rock, and several pieces of strap iron, have proved adequate to stop the pump filling vinegar into large wood tanks at a point when the level of liquid is well below overflow height.

This is how the control is constructed:

Ends of a length of strap iron (1 in photo) are bent in opposite directions. Then, one strap end is bolted to tank's top, and to the other a micro-switch (2) is attached.

Latter is positioned so that rod (3), when pushed up through a hole in the tank top by a float on its lower end, operates the micro-switch. This interrupts current to the motor driving the pump which delivers vinegar to the tanks. Brace (4) guides the rod in its ascent or descent.

So long as the vinegar level in the tank is high enough to hold the micro-switch open, the pump remains inoperative. Light (5), indicates when pump motor is running.—*C. F. Heublein & Bro., Inc., Hartford.*

when you specify light wall schedule 5 pipe

WHAT SCHEDULE 5 PIPE IS—
A light wall pipe, Carpenter Schedule 5 gives you more feet of pipe for every pound of scarce stainless steel. So you can quickly see how Schedule 5 reduces your cost per foot. Plus the fact that the larger I.D. means increased flow area.

HOW SCHEDULE 5 REDUCES COSTS
First saving is 40% to 50% on the cost of your pipe.

Since Schedule 5 is considerably lighter, this means quicker and easier installation.

And, because the increased capacity of Schedule 5 lets you use the next smaller pipe size, you can reduce substantially your costs of valves, fittings, etc.

FITTINGS ARE AVAILABLE
This pipe is easily adapted to use with existing lines of tubing or Schedule 40 and 10 pipe, using simple connectors. Fittings as well as stocks of Schedule 5 pipe are carried by conveniently located Carpenter distributors.

ADDITIONAL ADVANTAGES

Tubing sizes can now be replaced with light wall *pipe* . . . for ready hook-up with standard valves, pumps and other equipment which is normally manufactured in pipe sizes.

Data Sheets give you complete information about Carpenter Schedule 5 Stainless Pipe. Write for your personal copy. THE CARPENTER STEEL COMPANY, Alloy Tube Division, Union, N. J.
Export Dept.: The Carpenter Steel Co., Port Washington, N.Y. "CARSTEELCO"

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STAINLESS TUBING & PIPE

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You get the direct and authentic reproduction of raspberries in their full perfection in Raspberry Flavor by Firmenich. For Firmenich took fully ripe raspberries, freshly severed from the stem, captured their delicate and fugitive flavor, and by original research reconstructed it in all its significant and desirable components. Firmenich Raspberry comes to you as a precise and potent flavor material of the utmost purity and stability to enhance the flavor of your products and to make them more attractive to your customers.

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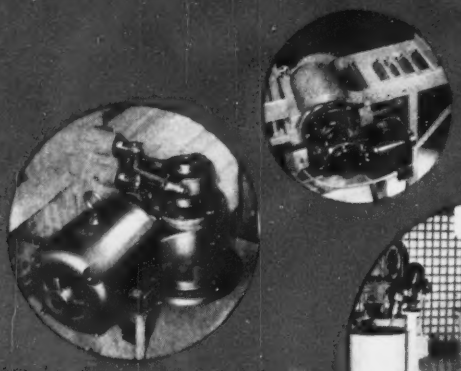

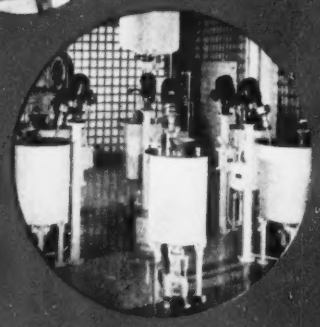

On big jobs or little ones it pays to take advantage of Master's unusual ability to supply the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact power package.

Don't put up with make-shift assemblies when you too may be enjoying these advantages. Master Motors, available in thousands and thousands of types and ratings (up to 200 HP) give you a selection you can get nowhere else.

Open, enclosed, splash proof, fan-cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

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Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

THE MASTER ELECTRIC COMPANY
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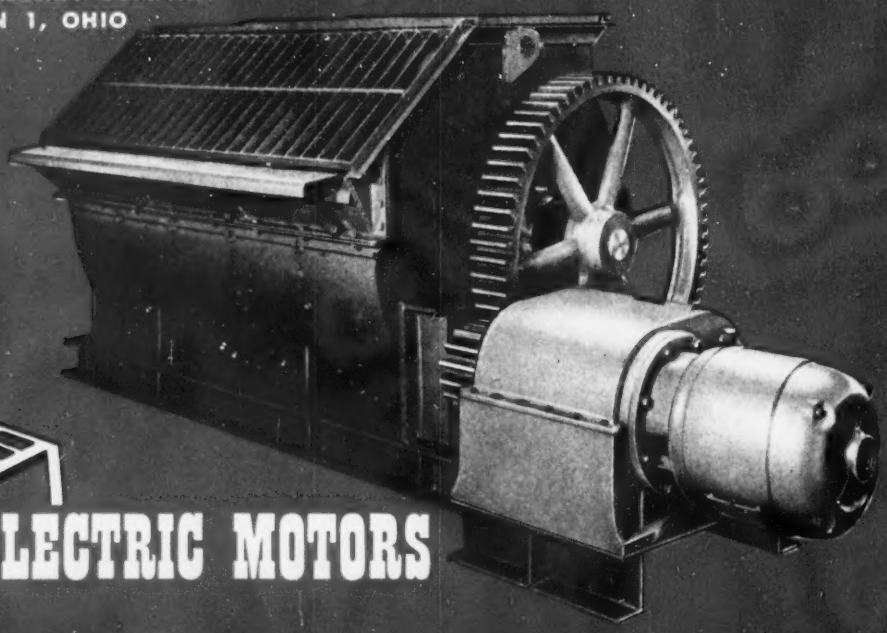

MASTER
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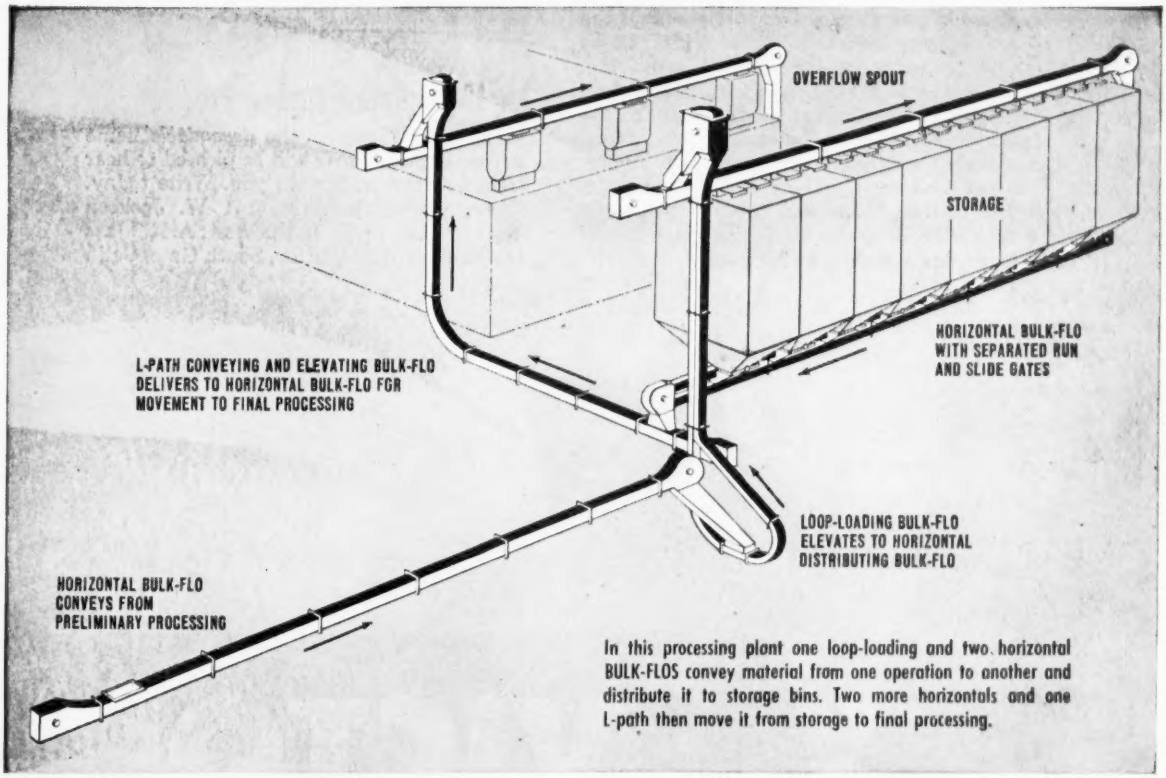
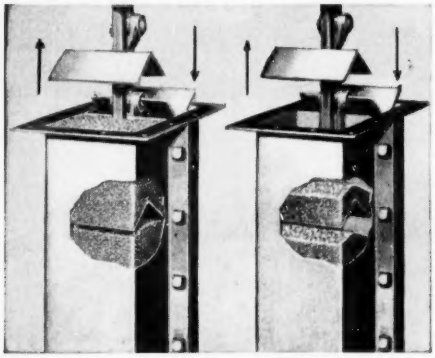
Link-Belt BULK-FLO combines feeding - conveying - elevating . . .


OVERFLOW SPOUT
STORAGE
HORIZONTAL BULK-FLO WITH SEPARATED RUN AND SLIDE GATES
L-PATH CONVEYING AND ELEVATING BULK-FLO DELIVERS TO HORIZONTAL BULK-FLO FOR MOVEMENT TO FINAL PROCESSING
LOOP-LOADING BULK-FLO ELEVATES TO HORIZONTAL DISTRIBUTING BULK-FLO
HORIZONTAL BULK-FLO CONVEYS FROM PRELIMINARY PROCESSING

In this processing plant one loop-loading and two horizontal BULK-FLOS convey material from one operation to another and distribute it to storage bins. Two more horizontals and one L-path then move it from storage to final processing.



Fully or partially loaded—Link-Belt BULK-FLO provides positive, gentle movement of material. Self-clearing through intermediate runs, it prevents contamination.

to cut your handling costs

NOW—with *one* fully enclosed assembly—you can replace several handling units in less space . . . at lower cost. BULK-FLO combines three functions in one, offers true versatility in bulk material handling.

Operating independently of internal pressure, its solid flights provide positive, variable movement of material even at less than full capacity. BULK-FLO is gentle, too—individual "compartments" protect the material.

There's a wide range of designs that can be engineered to match your system requirements. For complete information, call your Link-Belt office, or mail the handy coupon included here for your copy of Book 2475.

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For 55 years Victor has specialized in the development and manufacture of phosphates used for leavening, enrichment, acidifying, product conditioning, bread improvers, and emulsification. Today, Victor is one of the world's leading and largest producers of food phosphates. From Victor's research laboratories have come many contributions in the field of food chemistry. Solving food problems with an eye to improving product and increasing sales is our "long suit."

If you have a Product Problem,

bring it to Victor . . . the *dependable* name in *food* chemicals. We will be pleased to hear from you and work with you. Write today. Victor Chemical Works, 141 W. Jackson Blvd., Chicago 4, Ill. In the West: A. R. Maas Division, 4570 Ardine St., South Gate, Calif.

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Dependable Name in

Food Chemicals

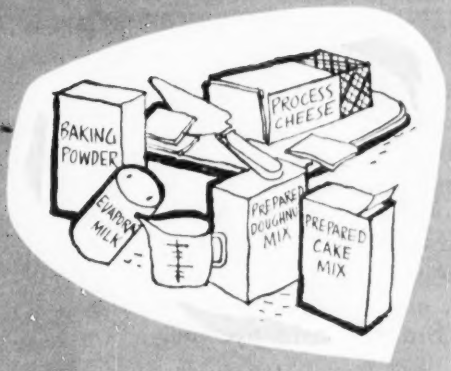
for 55 Years

Plants: CHICAGO HEIGHTS, ILL. • MT. PLEASANT, TENN. • MORRISVILLE, PA. • VICTOR, FLA.

For more information, use coupon on page 213.

AMMONIUM PHOSPHATES—
Manufacture of yeast, vinegar, yeast foods, bread improvers, to control pH of soda crackers.

CALCIUM PHOSPHATES—
Mineral fortification, conditioner for salt, soda, and sugar; leavening for self-rising flour, corn meal, prepared mixes, pancake flour, cookies, household and commercial baking powders; commercial production of angel food cakes.



SODIUM PHOSPHATES—
Emulsifier for process cheese and evaporated milk; baking acid in prepared doughnut flours, cake mixes, commercial baking powders and baking creams.

PHOSPHORIC ACID—
Manufacture of yeast, sugar, soft drinks, imitation gelatin.

SILVER BOW, MONT. • SOUTH GATE, CALIF. • NASHVILLE, TENN.

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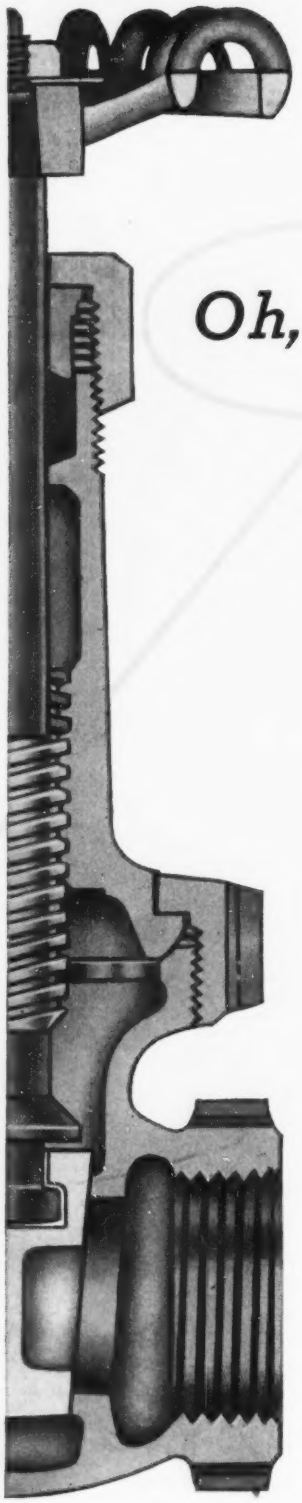
This valve is packed with 70 years' experience



Oh, I see

OIC's "7200 Line", the bronze valve that 70 years' experience built, incorporates the most advanced engineering, superior workmanship and the finest materials . . . its union bonnet, copper-nickel wedge and long-wearing OIC Alloy 40 stem, for example. You see the difference in the dependability, economy and long, maintenance-free life which OIC Bronze Valves give you.

THE OHIO INJECTOR COMPANY
WADSWORTH, OHIO

OIC
FOUNDED 1883

VALVES . . . FORGED & CAST STEEL, IRON & BRONZE

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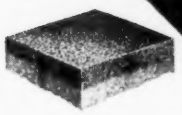
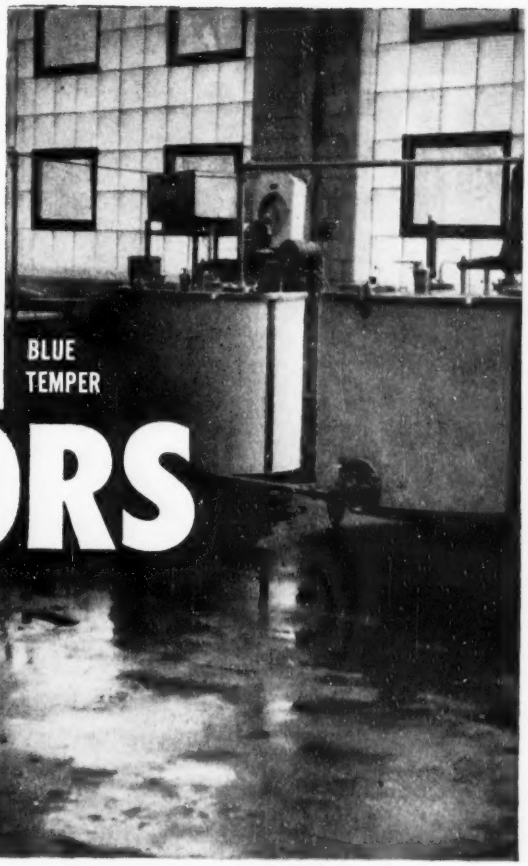
FEREM FLOORS

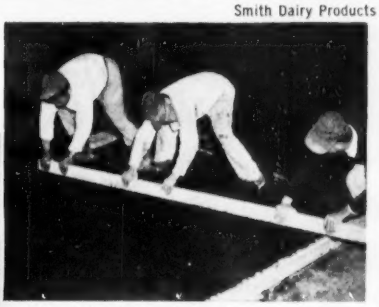
BLUE TEMPER





Smith Dairy Products Co.

These dense, slip-resistant heavy duty floors show no noticeable wear and involve practically no upkeep costs, even under abrasive traffic and shock. Such concrete floors are constructed with Ferem, the "Blue Temper" component in the floor topping (replacing sand, stone and silica). For heavy duty floors, loading platforms, etc., in newly constructed buildings, or when replacing damaged concrete areas. Ferem is resistant to corrosive solutions and the wet floor conditions of many industries.



Petelinz Dairy, Newburgh, N. Y.

Pacific Screw Products Corp., Los Angeles

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Breweries
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Please send me ☐ complete data on FEREM FLOORS

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....Protect Product Quality

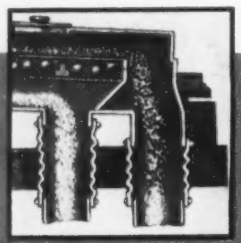
You can meet the highest standards of quality and assure yourself of economical, trouble-free operation with DAY RO-BALL SIFTERS for all scalping and sifting.

You get thorough separation of overs and thrus plus matchless accuracy in maintaining particle size because DAY RO-BALL SIFTERS employ the exclusive Super-Active Ball Cleaning Device.

Scores of rebound points on the mesh retainer screen insure even distribution of vibration over the entire screening surface. Result . . . the screen stays clean and free passage of through material is guaranteed.

Only DAY can offer this time-tested assurance of top performance. Learn the details . . . write today for free folder.

1146 Harrison Ave., Cincinnati 22, Ohio



DAY Super-Active Ball Cleaning keeps the screen clean and assures passage of through material.

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THE J. H. DAY COMPANY, CINCINNATI 22, OHIO

INCORPORATED • FOUNDED 1887

FOOD HAULING IS A SPECIALIZED BUSINESS. IT REQUIRES PROPER EQUIPMENT FOR A PROFITABLE OPERATION

For SWIFT PROTECTED RELIABLE hauling..

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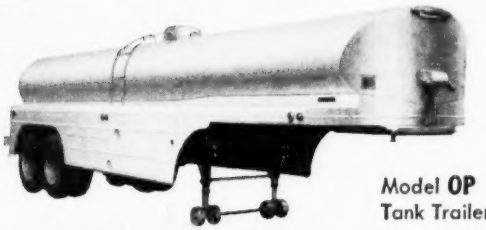
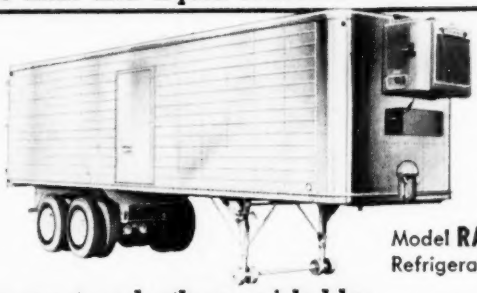


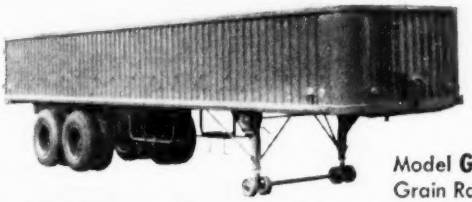
Model **OP**
Tank Trailer

For milk and liquid foods...



Model **RA**
Refrigerator Van

For meat and other perishables...



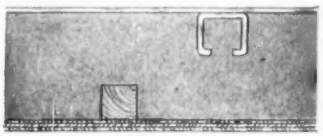
Model **GA**
Grain Rack

For hauling grains and citrus foods...

Model **EP**
Exterior Post Van

For general packaged food stuffs...

The Trailmobile tank warranty guarantees against shell leakage, and pays $50.00 a day as long as the unit is out of operation due to shell leakage. This guarantee is issued with every new Trailmobile tank and applies for the original owner's protection for a period of one year. This is in addition to the standard Trailmobile product warranty. It's additional proof that Trailmobile tanks are tops and the best buy you can make.



Floors, doors, top and sides of all Trailmobile Refrigerator Vans are scientifically insulated to prevent heat leaks. Picture above shows how Trailmobile staggers spacers and stringers, fills all side posts with Fiberglas to prevent even the smallest direct heat channel.

Before you ever get your Trailmobile trailer it's been proved right because Trailmobile's exclusive Electronic Tester tells under actual load and road conditions where any weakness might occur. This results in a trailer you can trust to give you years and years of reliable service.

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The Trend is to **TRAILMOBILE**

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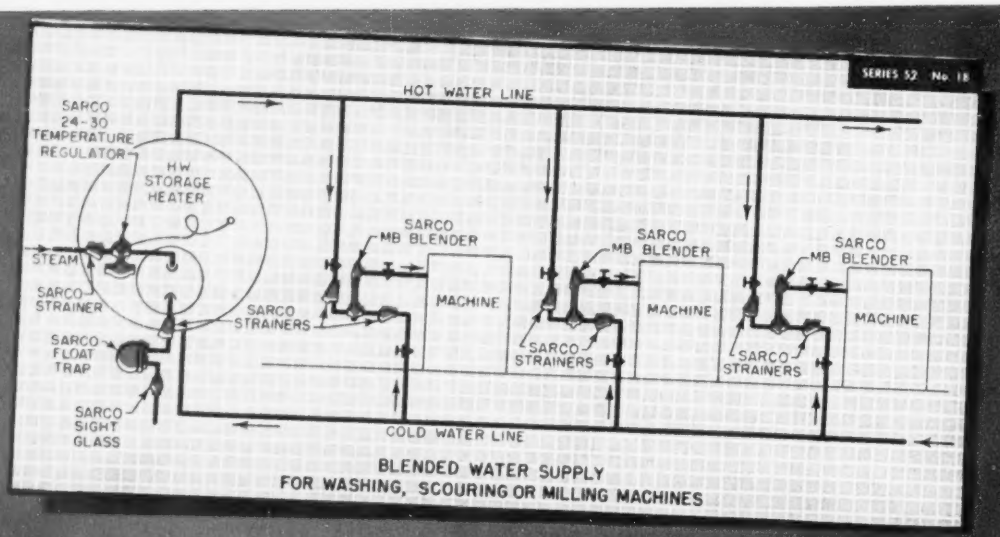


Tempered Water
controlled automatically

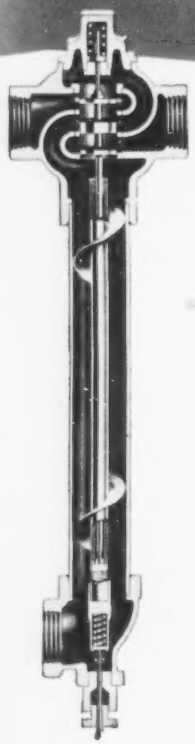


Fig 1—Sarco MB Water Blender, all types are described in Bulletin 800-7.

Sarco Water Blenders mix cold water with hot and automatically control the proportions to furnish tempered water at any desired constant temperature.

At the meat packing plant of Cross Bros., Inc., Philadelphia, blended water is used to wash down carcasses after the hide is removed. The temperature must be held close to 80°F. to do a thorough cleansing job without wasting fat.

A 2″ Sarco type MB-DS Water Blender, see Fig. 2, mixes cold water with 180°F. water from the hot water generator to provide blended water held constant at 80°F.

Customer is now installing a duplicate unit.

Sarco Blenders are also used widely as cooling controls by recirculating a varying portion of the cooling water.

For full information write for Catalog 800-7 to Sarco Company, Inc., Empire State Bldg., New York 1, N. Y. Branches in principal cities. Sarco Canada Ltd., Toronto 8, Ont.

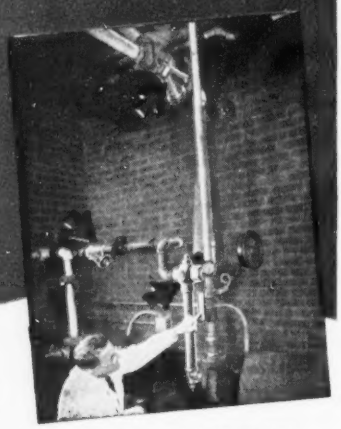


Fig. 2—2″ Sarco MB-DS Water Blender and Sarco strainer. One of 2 installed at Cross Bros., Inc., Meat Packers, Philadelphia, to supply water for carcass washing at 80°F. from service hot water at 180°F.

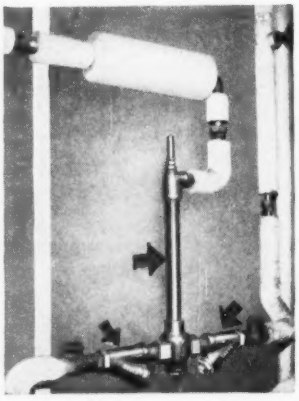


Fig. 3—1½″ Sarco MB Water Blender with Sarco mixing chamber and strainer to supply tempered water to gang showers at Inland Steel Company's No. 2 mill at East Chicago, Ind.

SARCO saves steam

improves product quality and output

421

HYSTER PRESENTS...

Two Completely NEW Lift Trucks!

30" Free Lift
75" Turning Radius
38" Wide
82½" Collapsed
Height (with 9' lift)

The Ultimate in 4000-lb.
Lift Truck Maneuverability

THE UC-30

Capacity, 3000 lbs.
(24" load center)
Length, only 74⅝"

THE YC-40

Capacity, 4000 lbs.
(at 24" load center)
Length, only 78¾"

STREAMLINED AND FUNCTIONALLY DESIGNED FOR UNEQUALED PERFORMANCE IN CAR LOADING, WAREHOUSE AND ALL OTHER CLOSE-QUARTER OPERATIONS

Hyster now offers, in addition to the pneumatic-tired 4000-lb. YT-40 Lift Truck, a *new* lift truck in the 3000-4000-lb. class—*designed specifically for close-quarter operation!*

The new Hyster YC-40 is smaller than the pneumatic-tired YT-40 because it is *functionally* designed to more compact dimensions, utilizing smaller cushion tires. *The YC-40 is recommended for those applications where it is not necessary to use pneumatic tires.*

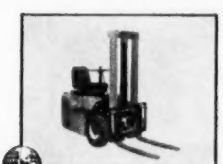
The new Hyster UC-30 is basically a YC-40 Lift Truck with a lighter counterweight, but with the same engine. Both incorporate advanced features not found in any other lift truck today! Call your Hyster dealer, or write for Catalog 1241 to:

HYSTER COMPANY

2902-35 N. E. Clackamas
Portland 8, Oregon

1010-35 Myers St.
Danville, Illinois

Be Sure to Call HYSTER Before You Buy ANY Lift Truck!



Hyster 20
for 1000-2000-lb. work requiring pneumatic tires.

Hyster UC-30
for 3000-lb. close-quarter work. Cushion tires.

Hyster YT-40
for 4000-lb. work requiring pneumatic tires.

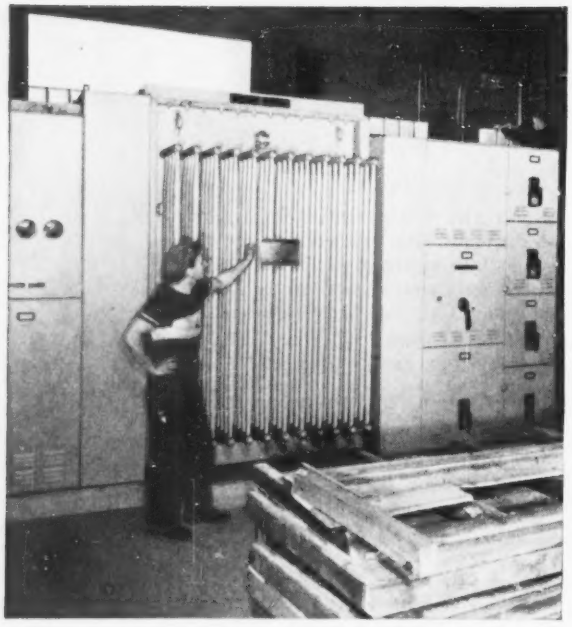
Hyster YC-40
for 4000-lb. work in close quarters. Cushion tires.

HYSTER COMPANY • FOUR FACTORIES: Portland, Oregon; Danville, Illinois; Peoria, Illinois; Nijmegen, The Netherlands

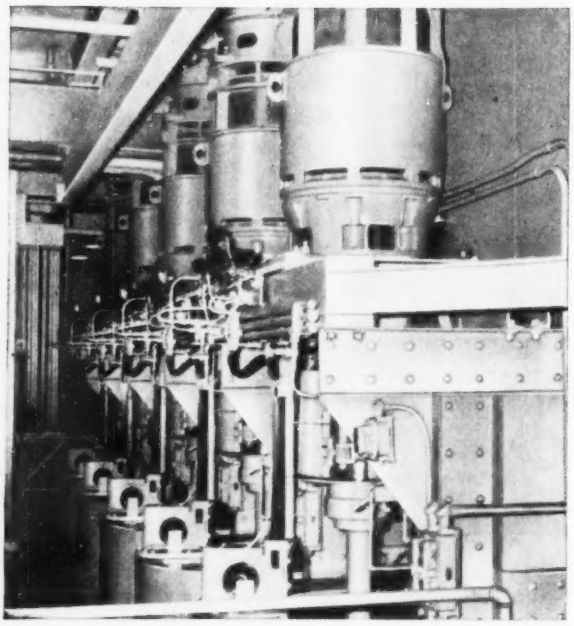
For more information, use coupon on page 213.

MASTER PLAN for National Sugar's new a-c power distribution system at Philadelphia was developed by this engineering team. Left to right: Frank LeCompte, Construction Engineer; Joseph Harrison, Electrical Engineer; Newton Smith, Plant Engineer; Lloyd Johnson, G-E Sales Engineer. Plan served as guide to flexible system that will simplify plant expansion.

Planned step-by-step modernization

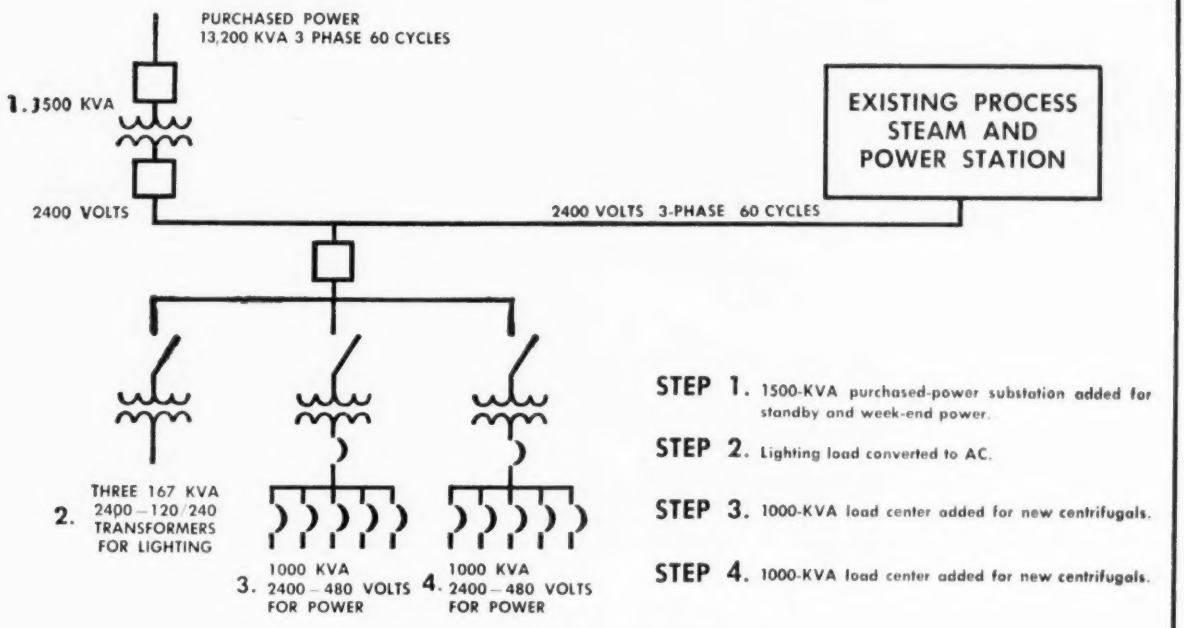


VOLTAGE IS STEPPED DOWN FOR CENTRIFUGALS by this G-E load-center substation. As future expansion takes place, others will be located in load areas throughout the plant.



MOTORS, CONTROL COST LESS—National Sugar's Pennsylvania Division modernized with automatic a-c driven centrifugals like these—cut installation costs, simplified controls.

For more information, use coupon on page 213.


PURCHASED POWER
13,200 KVA 3 PHASE 60 CYCLES
1. 1500 KVA
2400 VOLTS
EXISTING PROCESS STEAM AND POWER STATION
2400 VOLTS 3-PHASE 60 CYCLES
2. THREE 167 KVA 2400—120/240 TRANSFORMERS FOR LIGHTING
3. 1000 KVA 2400—480 VOLTS FOR POWER
4. 1000 KVA 2400—480 VOLTS FOR POWER
STEP 1. 1500-KVA purchased-power substation added for standby and week-end power.
STEP 2. Lighting load converted to AC.
STEP 3. 1000-KVA load center added for new centrifugals.
STEP 4. 1000-KVA load center added for new centrifugals.

SUGAR PRODUCTION WAS UNINTERRUPTED while the National Sugar Refining Company—producers of Jack Frost, Quaker, and Arbuckle's Sugar—carried out step-by-step power system expansion. Load-center substations, heart of new plan, make expansion easy—keep cost at minimum. Savings in cable, and a-c drives, have more than paid for system.

pays off at National Sugar Refining

Long-range system planning results in area-by-area modernization of both process and electrical systems at minimum investment

If your electrical distribution system can't take care of expanding production—and if complete modernization at one time would interfere with production and be uneconomical—then you'll be interested in the way the Pennsylvania Sugar Division of the National Sugar Refining Company solved this problem.

System *planning* was their key. G-E application engineers worked with Mr. Frank LeCompte, Construction & Development Engineer at National Sugar's Pennsylvania Division. Together, they designed a master a-c distribution system that was geared to the present system—and would accommodate future plant growth at minimum cost.

Then National Sugar put this master plan into action. The new a-c distribution system was purchased and installed section by section as processing facilities were modernized and expanded. This new system paid its way in savings in equipment, materials, and installation costs.

Reductions in original costs and capitalized operating expenses of ten new centrifugals, effected by using a-c instead of d-c drives, equalled the price of two new G-E load-center unit substations and several units of 2300-V switchgear. A 1500-KVA substation, operating from purchased power, quickly justified itself in meeting emergency standby requirements and in furnishing power on weekends.

General Electric application engineers can help you save the same way with a new power distribution system. Contact your nearby Apparatus Sales Office early in your planning. General Electric Co., Schenectady 5, N. Y. 652-13

1878 75 1953 YEARS OF ELECTRICAL PROGRESS

Engineered Electrical Systems for Food Processing Plants

GENERAL ELECTRIC

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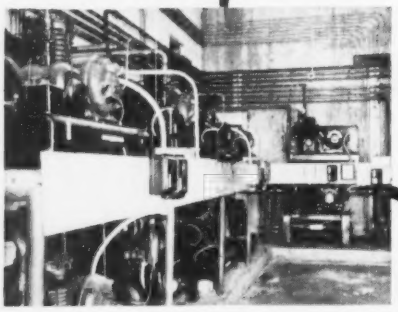
Safeguarding frozen foods in modern supermarkets

with "FREON"-operated units



General view of Rapp's modern supermarket in St. Louis, and battery of compressors that supply refrigeration throughout store.

Just as the processing of the finest quality frozen foods requires the most dependable of refrigeration systems, so also does the marketing of these products.

Today, the tasty freshness and preserved quality of all kinds of frozen foods and ice cream are safely protected in low-temperature refrigerators and walk-in coolers refrigerated with "Freon"-operated equipment.

Typical example is Rapp's Market in St. Louis, Mo. Here, a battery of "Freon"-charged units of *Hussmann* manufacture maintains the necessary low temperature for certain protection. Frozen foods are placed in rows of self-service display cases that invite customer inspection and help sell the products.

But whether you are marketing frozen foods or are in the more complicated business of processing them . . . you can help protect your investment—while safeguarding the quality of your products—by installing refrigeration equipment that is operated with "Freon" refrigerants.

These refrigerants are ideal for all branches of the frozen food industry . . . processing, shipping, storing and retailing. They provide dependable low-temperature protection whenever and wherever it is required. "Freon" refrigerants are safe . . . nonflammable, nonexplosive, virtually nontoxic . . . and their laboratory-controlled uniformity further contributes to long, economical and satisfactory performance of the machines. That is why manufacturers, engineers and contractors in the field of air conditioning and refrigeration highly endorse equipment designed to utilize "Freon" refrigerants. There are many excellent machines available to meet your specific needs. E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, Wilmington 98, Delaware.

KINETIC

"FREON" *Safe Refrigerants*

DU PONT

"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

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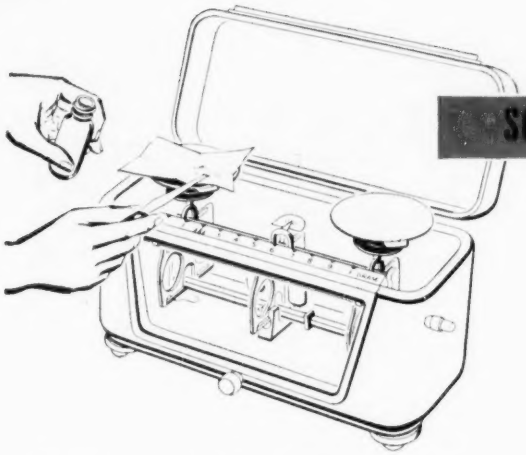


SO LITTLE MAKES SO MUCH DIFFERENCE!

Protect Color...Save Flavor of Frozen Fruit with Pfizer

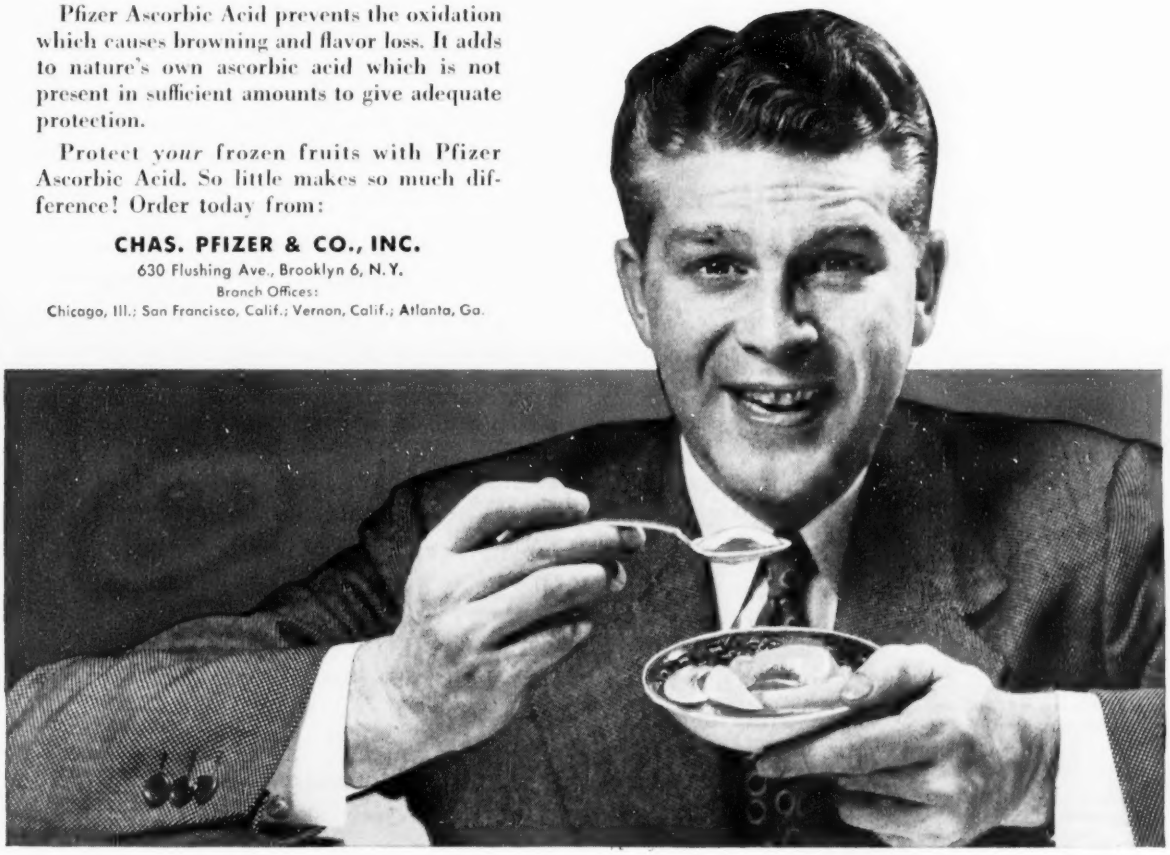
Ascorbic Acid

● The recent price reduction in Pfizer Ascorbic Acid makes it more economical than ever to give your frozen fruits the proper color and flavor protection. Only a small quantity, a little more than a pinch, of ascorbic acid costing *less than four tenths of a cent* is necessary to protect a pound of fruit.

Pfizer Ascorbic Acid prevents the oxidation which causes browning and flavor loss. It adds to nature's own ascorbic acid which is not present in sufficient amounts to give adequate protection.

Protect *your* frozen fruits with Pfizer Ascorbic Acid. So little makes so much difference! Order today from:

CHAS. PFIZER & CO., INC.
630 Flushing Ave., Brooklyn 6, N.Y.
Branch Offices:
Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.



Manufacturing Chemists for Over 100 Years

Pfizer

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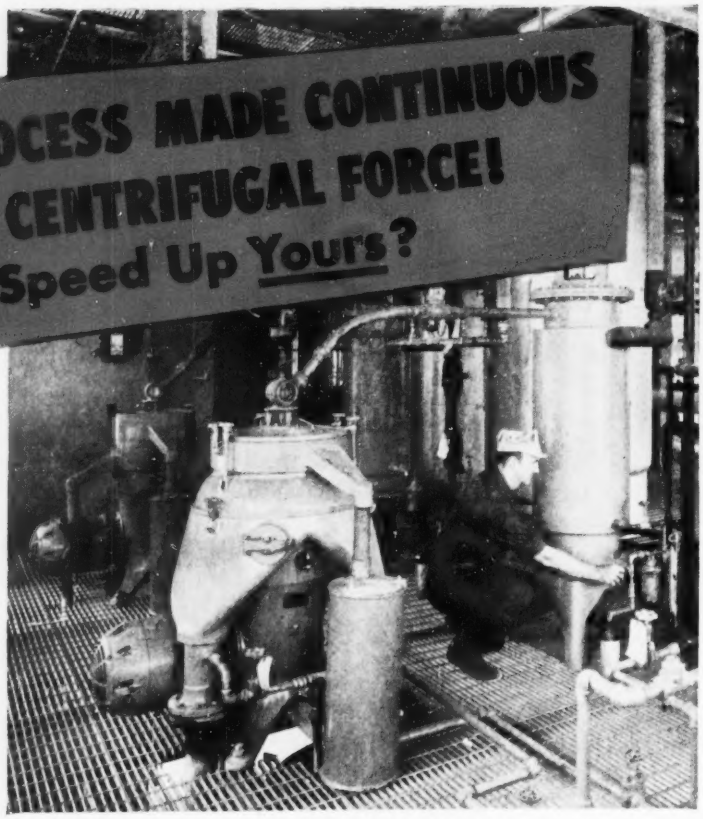
ANOTHER PROCESS MADE CONTINUOUS BY DE LAVAL CENTRIFUGAL FORCE! —Can It Speed Up Yours?



Refining Rice Bran Oil

The production of rice bran oil can be speeded up very effectively by using De Laval centrifugals at two points in the refining process. One De Laval machine, the Soapstock Separator, removes the soap and waxes from the oil. Another type of De Laval centrifuge separates out excess alkali and other impurities.

For many years De Laval machines have been used to refine vegetable oils. Rice bran oil separation is merely a logical extension of this experience. It is one more example of how a De Laval centrifuge can save time and money by speeding up a process.

Usually, centrifugal separations are quite easy; in some cases, De Laval machines will break emulsions that are too tight to break by other means.

● Why not tell us of ***your*** problem.

THE DE LAVAL SEPARATOR COMPANY Chicago POUGHKEEPSIE San Francisco

DE LAVAL FOR FASTER PROCESSING SYSTEMS

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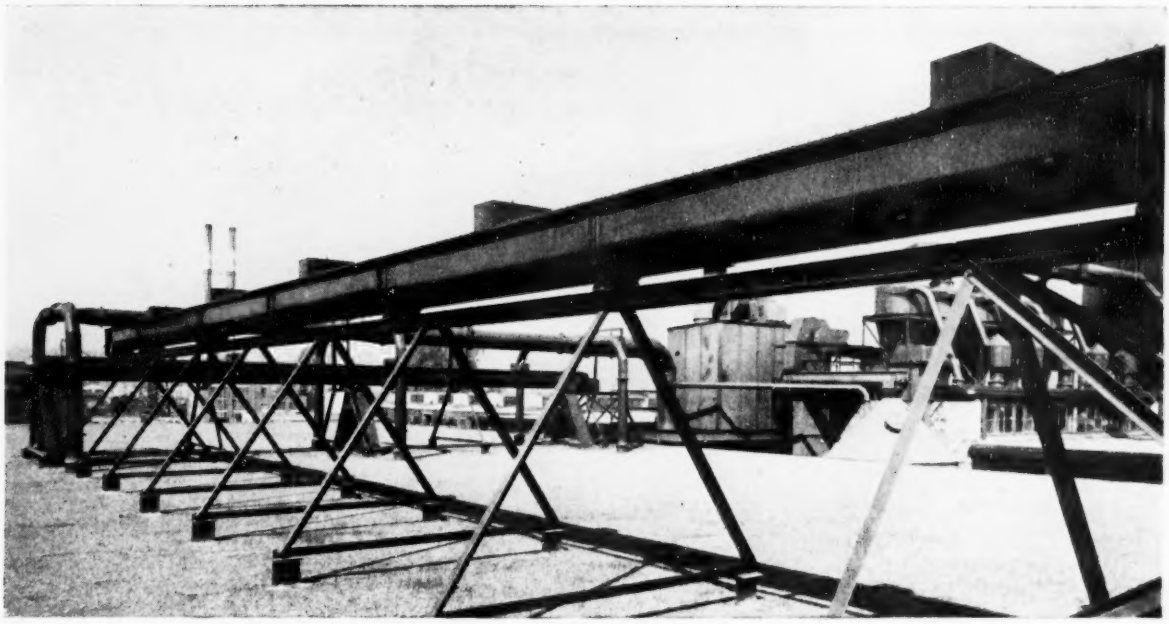


On roof above storage bins, this 14-in. diam. Helicoid screw conveyor is one of 30 Link-Belt screw conveyors transporting soybean meal from receiving hoppers to storage bins, or to processing.

There's no substitute for "total engineering" in screw conveyors

LINK-BELT integrates all components to give you the right screw conveyor for your job

HERE'S how "total engineering" works for you when you buy Link-Belt Screw Conveyors.

First, conveying specialists analyze your problem. Then, Link-Belt's vast experience in design and manufacture is at your command to recommend the screw conveyor—or system of conveyors—for your particular requirements. The right components are then selected from Link-Belt's complete range of types and sizes.

Link-Belt "total engineering" on your screw conveyors is your assurance of efficient design . . . balanced performance.

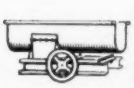
To benefit from Link-Belt's materials handling experience and engineering service, contact the Link-Belt office near you.

LINK-BELT designs and builds all components

SCREWS—Link-Belt makes a complete range of conveyor screws—Helicoid, Sectional Flight, Cut Flight, Ribbon Flight, Paddle type and other special types for such diverse applications as feeding, conveying, mixing, agitating, stirring, blending, etc.

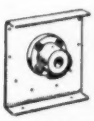
HANGERS—Available in a variety of styles and mountings, with various bearing materials and steel or cast hanger frames.

TROUGHS—Link-Belt builds flanged, angle flanged, flared, rectangular, dust-seal, jacketed and drop-bottom types in steel or alloy metals. Variety of connections, supports, covers and clamps offers added design flexibility.

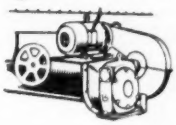


SPOUTS & GATES—Plain discharge spouts can be fixed or detachable. Discharge gates, flat or curved slide, can be hand or rack-and-pinion operated.

SHAFTS & COUPLINGS — Conveyor couplings and end shafts are designed for adequate torsional strength and have jig-drilled coupling bolt holes for accurate alignment.



TROUGH ENDS—Steel or alloy metal plate or cast trough ends to match all trough shapes, provide required shaft bearing support and alignment. Seal glands to protect bearings, if required.



DRIVES — Link-Belt designs and builds many forms of drives to suit specific conditions—Enclosed gear, Electrofluid, P.I.V. variable speed, and chain drives of various types.

LINK-BELT

SCREW CONVEYORS 13.187

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in Principal Cities.

For more information, use coupon on page 213.

The public loves good vanilla flavor.

The best commercial extracts are those most closely resembling a pure old-fashioned extraction.

Be guided by the recommendations of a house you can trust and buy the best grade of vanilla you can afford. A bargain vanilla is often expensive in the long run.

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521 WEST 57th STREET • NEW YORK 19, N. Y.

Alva FLAVORS

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Wo oosh!

...with no damage done!

You'll certainly like the important savings on handling costs from Fairbanks-Morse *Bladeless* Impeller Food Pumps. They eliminate food damage losses so common with ordinary transfer pumps!

The difference is in the impeller. With no blades to catch or damage, you can handle the most delicate fruits and vegetables—even hard-boiled eggs have been pumped without cracking!

Check on this *Bladeless* Impeller Food Pump for your operations—call your Fairbanks-Morse Branch Pump Engineer or write to Fairbanks, Morse & Co., Chicago 5, Illinois.

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a name worth remembering when you want the best

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY
RAIL CARS • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

Illustrated is Versicon—one of Thermoid's "Basic Five". A true all-purpose hose for handling air, water, oil or welding gases.

When you are in need of hose—
Suggest you look at Thermoid!

See how extra strength is built into each length—with either tough rayon cords or special cotton fabric. Abrasive resistant—light—easily handled—resists kinking—designed for maximum service. Whether it be one of Thermoid's multiple service types or a hose designed for a specific use, your Thermoid Distributor can recommend the type best suited for your particular requirements.

Call your Thermoid Distributor. He has complete information on all types of Thermoid Hose and other Thermoid products. Our experienced Sales Engineers are available for help with unusual problems.

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Industrial Rubber Products
Quality Value Service

It will pay you to specify Thermoid.

Conveyor & Elevator Belting • Transmission Belting
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Thermoid

Rubber Sheet Packings • Molded Products
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Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

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Good Taste brings BIG returns

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SEASONINGS

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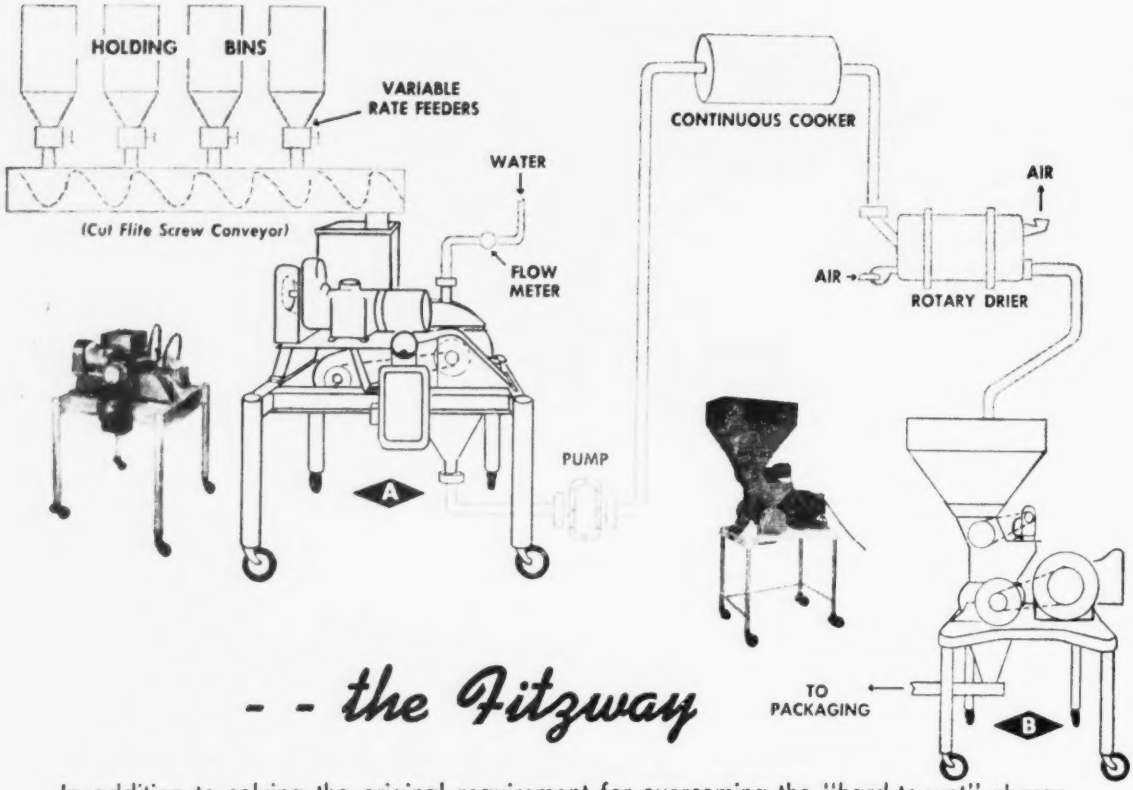
WM. J. STANGE CO. CHICAGO 12, ILL. OAKLAND 21, CALIF.

In Canada: Stange-Pemberton, Ltd. New Toronto, Ont.

PRINTED IN U. S. A.

CONTINUOUS "SPRAY BLEND" PROCESS...



- - the Fitzway

In addition to solving the original requirement for overcoming the "hard-to-wet" characteristics of flour in water, the FitzMill Comminutor at "A" also provided a complete system for mixing all the various dry products with water in a continuous operation — maintained a formula ratio between all ingredients—prevented shutdowns from previous screen clogging—improved quality thru elimination of hard, burnt particles not thoroughly wetted — granulated product with FitzMill at "B" to proper finished particle size for packaging — all at a saving in labor and space.

- Prevent marbling, spottiness.
- Maintain formula ratio.
- Combine liquids and dry products in continuous operation.
- Thorough coating.
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- Controlled granulating, chopping, grinding, pulverizing.
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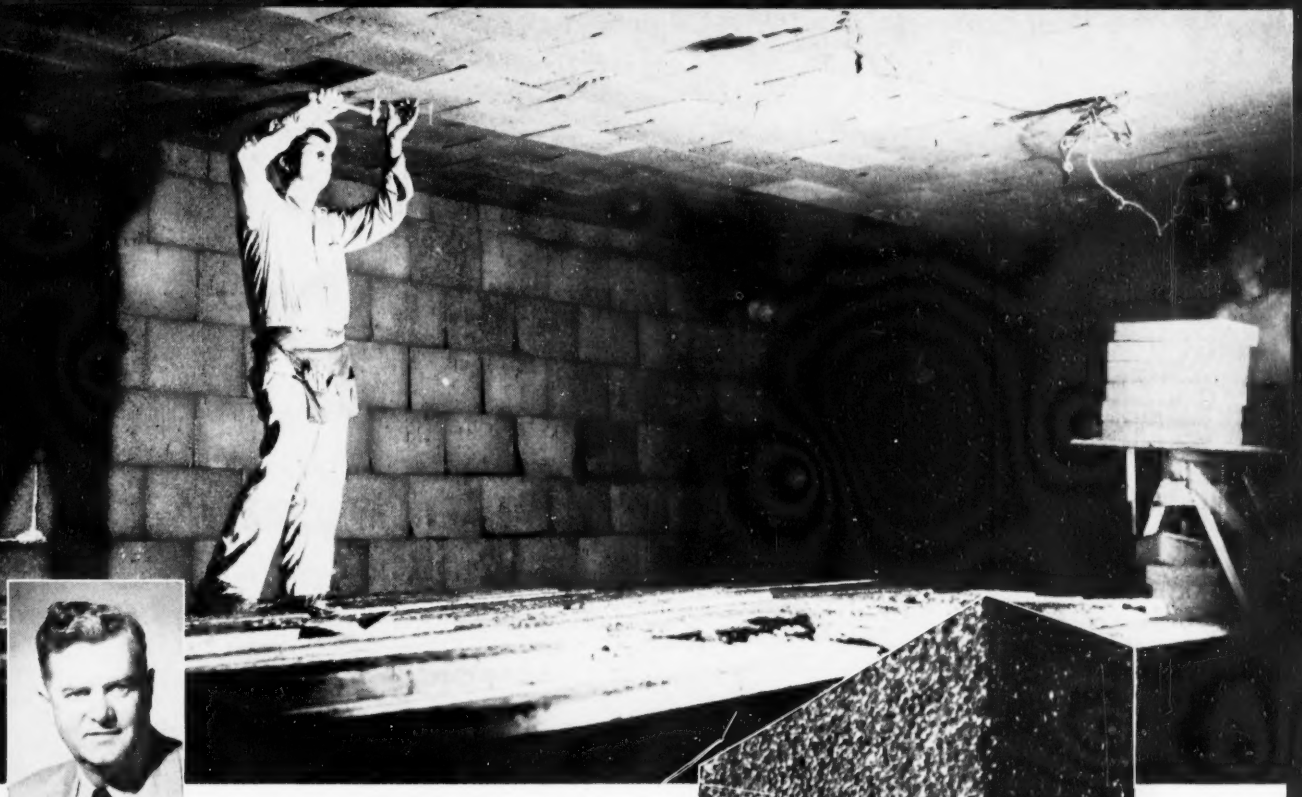

Insulation Contractor: Gordon Insulation Co., East St. Louis, Illinois

L. E. JOSLIN, Krey Packing Co., finds

FOAMGLAS®

the ideal insulation for freezer and cooler rooms

"The walls, floors and ceilings of our freezer and cooler rooms, in constant operation at 10°F. and 32°F., were insulated with FOAMGLAS over two years ago," reports L. E. Joslin, Assistant Mechanical Superintendent, Krey Packing Company, St. Louis, Missouri and Belleville, Illinois. "Since that time, FOAMGLAS has proved to be the ideal insulation for our refrigerated spaces because of its long, trouble-free life."

Experience probably has taught you, too, that ordinary insulations readily absorb moisture, impairing thermal efficiency and causing deterioration. The perfect answer to this problem is FOAMGLAS, the *stay-dry* insulation . . . the unique, rigid structure of sealed glass cells which are impervious to moisture or vapor and unaffected by fire or vermin . . . that's why you, like Krey Packing Company, can count on FOAMGLAS for long, constant efficiency.

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☐ Send engineer to help with specific problem.
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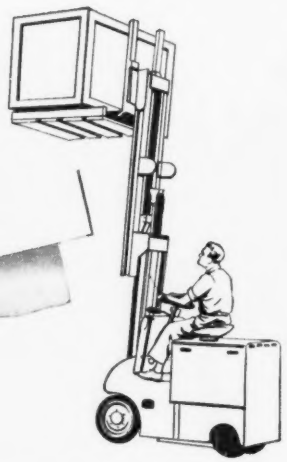
The NEW T-H Exide-Ironclad

★ **20% more capacity in the same space**

★ **Lowest cost per A.H. to own and operate**



Heavier demands on all types of battery-powered haulage equipment dictate the need for batteries with greater capacity.

The new Exide-Ironclad T-H battery gives 20% more capacity in the same space—WITHOUT SACRIFICE OF LONG LIFE for which Exide-Ironclad Batteries are famous.

This new T-H battery is of the time-tested Exide-Ironclad construction, employing the exclusive slotted tube positive plate. New materials have made structural changes possible, which permit the use of larger positive plates—resulting in increased capacity.

The T-H line of Exide-Ironclad Batteries includes capacities for all battery-powered haulage units.

Now-more than ever before...
YOUR BEST POWER BUY
AT ANY PRICE!

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THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 2
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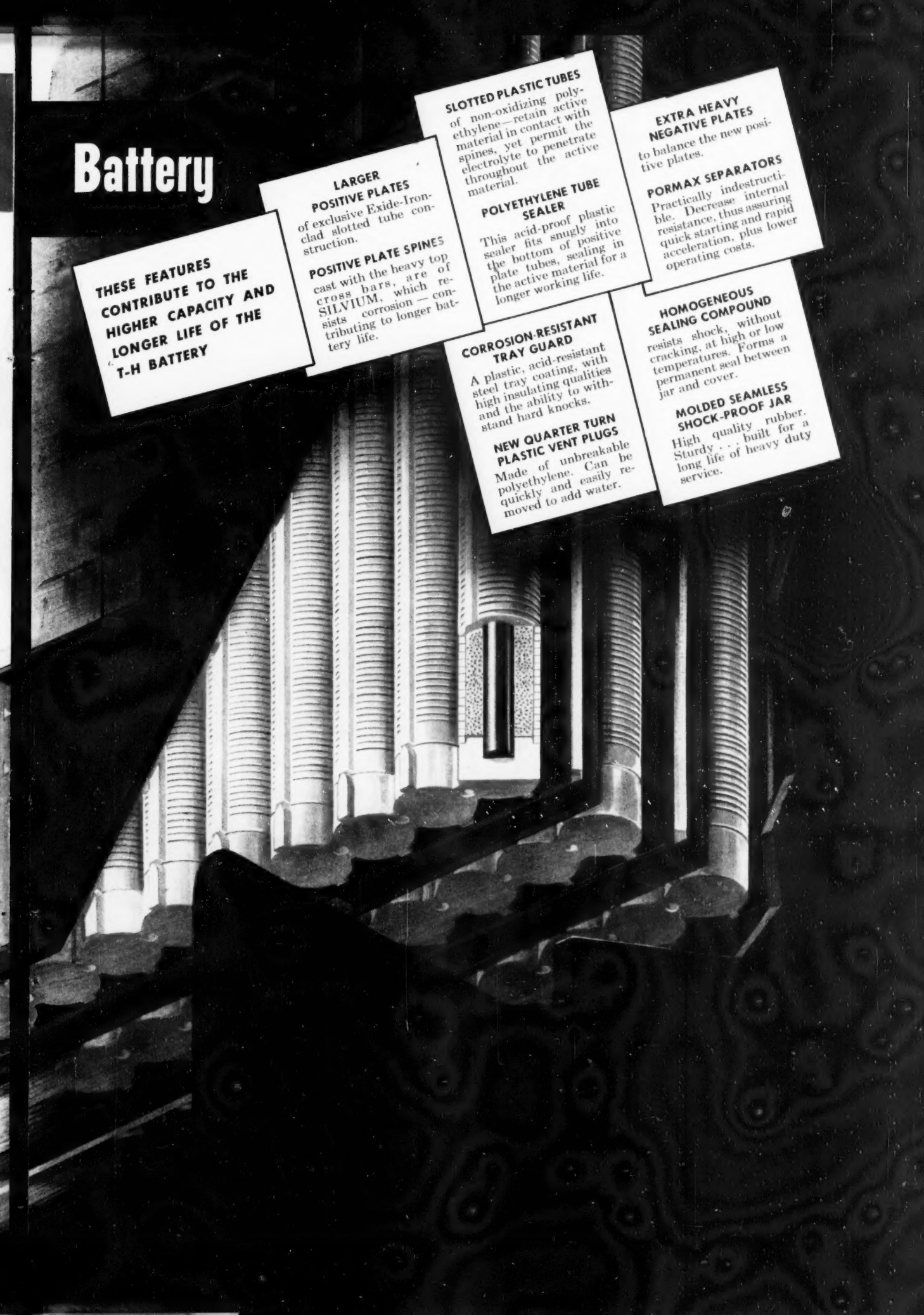
1888—DEPENDABLE BATTERIES FOR 65 YEARS—1953

"EXIDE", "EXIDE-IRONCLAD", "SILVIUM", "PORMAX", *Reg. T.M. U.S. Pat. Off.*

Battery



THESE FEATURES CONTRIBUTE TO THE HIGHER CAPACITY AND LONGER LIFE OF THE T-H BATTERY

LARGER POSITIVE PLATES
of exclusive Exide-Ironclad slotted tube construction.

POSITIVE PLATE SPINES
cast with the heavy top cross bars, are of SILVIUM, which resists corrosion — contributing to longer battery life.

SLOTTED PLASTIC TUBES
of non-oxidizing polyethylene — retain active material in contact with spines, yet permit the electrolyte to penetrate throughout the active material.

POLYETHYLENE TUBE SEALER
This acid-proof plastic sealer fits snugly into the bottom of positive plate tubes, sealing in the active material for a longer working life.

EXTRA HEAVY NEGATIVE PLATES
to balance the new positive plates.

PORMAX SEPARATORS
Practically indestructible. Decrease internal resistance, thus assuring quick starting and rapid acceleration, plus lower operating costs.

CORROSION-RESISTANT TRAY GUARD
A plastic, acid-resistant steel tray coating, with high insulating qualities and the ability to withstand hard knocks.

NEW QUARTER TURN PLASTIC VENT PLUGS
Made of unbreakable polyethylene. Can be quickly and easily removed to add water.

HOMOGENEOUS SEALING COMPOUND
resists shock, without cracking, at high or low temperatures. Forms a permanent seal between jar and cover.

MOLDED SEAMLESS SHOCK-PROOF JAR
High quality rubber. Sturdy . . . built for a long life of heavy duty service.

ANSWERS TO YOUR QUESTIONS ABOUT ROCHE VITAMIN A

Q. *What is Roche vitamin A?*

A. It is vitamin A, the product of a synthesis which starts with Citral, from lemon grass oil. It is identical biologically with the vitamin A from other sources, such as fish livers. A Roche research team directed by Dr. Otto Isler announced their famous synthesis in 1947. This successful, economical process is now used to produce vitamin A of superb quality by the tons at Roche Park.

Q. *Does Roche vitamin A have a "fishy" odor or taste?*

A. None whatever, nor is there any "fishy burp." In fact, Roche vitamin A has almost no odor or taste and so is preferred for processed foods such as margarine.

Q. *Will I be able to get a steady supply of Roche vitamin A?*

A. You will. The entire commercial needs of the food and pharmaceutical industries of the United States and Canada could be met from our Nutley plant.

Q. *Can I be sure of a "standard" product?*

A. You can. Roche vitamin A is manufactured under strict laboratory control. It is more stable. It is uniform. The regular commercial types of Roche material, if diluted to 50,000 to 65,000 units per gram, will meet the specifications of U.S.P. XIV for oleovitamin A. It is a product of excellent quality.

Q. *What about price?*

A. Roche vitamin A is not subject to wide fluctuation of price, as has been true with vitamin A from natural sources. This can mean large savings for you as there is no need to carry large inventories as was the case prior to the introduction of Roche vitamin A in 1950. Never before has the purchaser been assured of such low prices, consistent with quality and uniformity.

Q. *How is Roche vitamin A packed?*

A. All Roche vitamin A is packed under conditions which assure its stability in customary shipment and storage.

Q. *Can I get help from Roche in using vitamin A in my products?*

A. Yes, certainly! Roche technical experts who supplied so much data at the hearings for amended Definitions and Standards of Identity for Margarine are always at your service. It is important to you that Roche specializes in the manufacture of vitamins.

Q. *Is Roche vitamin A available in different types and potencies?*

A. It is. The following table shows the types most popular in food manufacturing.

TYPE	DESCRIPTION	POTENCY	ADDITIVE*
P1MO	Vitamin A palmitate	1,000,000 U.S.P. XIV units per gram	Edible oil only for standardization
P1.3	Vitamin A palmitate	Ranging between 1,250,000 and 1,500,000 U.S.P. XIV units per gram	None
A1MO	Vitamin A acetate	1,000,000 U.S.P. XIV units per gram	Edible oil only for standardization

*Antioxidants or other additives are included on customer's specifications.

Notes: Type P1MO has less tendency to crystallize during storage and handling than higher concentrations of vitamin A palmitate and acetate.

Type P1.3 is more susceptible to crystallization than type P1MO but can be handled without difficulty when using certain precautions.

Q. *Are special blends available for the margarine industry?*

A. Yes. Roche will supply blends to your specifications. A modern blending and canning plant is at your service.

Q. *What kind of service can I expect on special blends?*

A. The best—with special attention to accuracy, quality and control.

ROCHE

Vitamin A acetate and palmitate

Call Roche for vitamins

Vitamin Division

HOFFMANN-LA ROCHE INC.

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Pacific Coast: L. H. BUTCHER CO., San Francisco • Los Angeles
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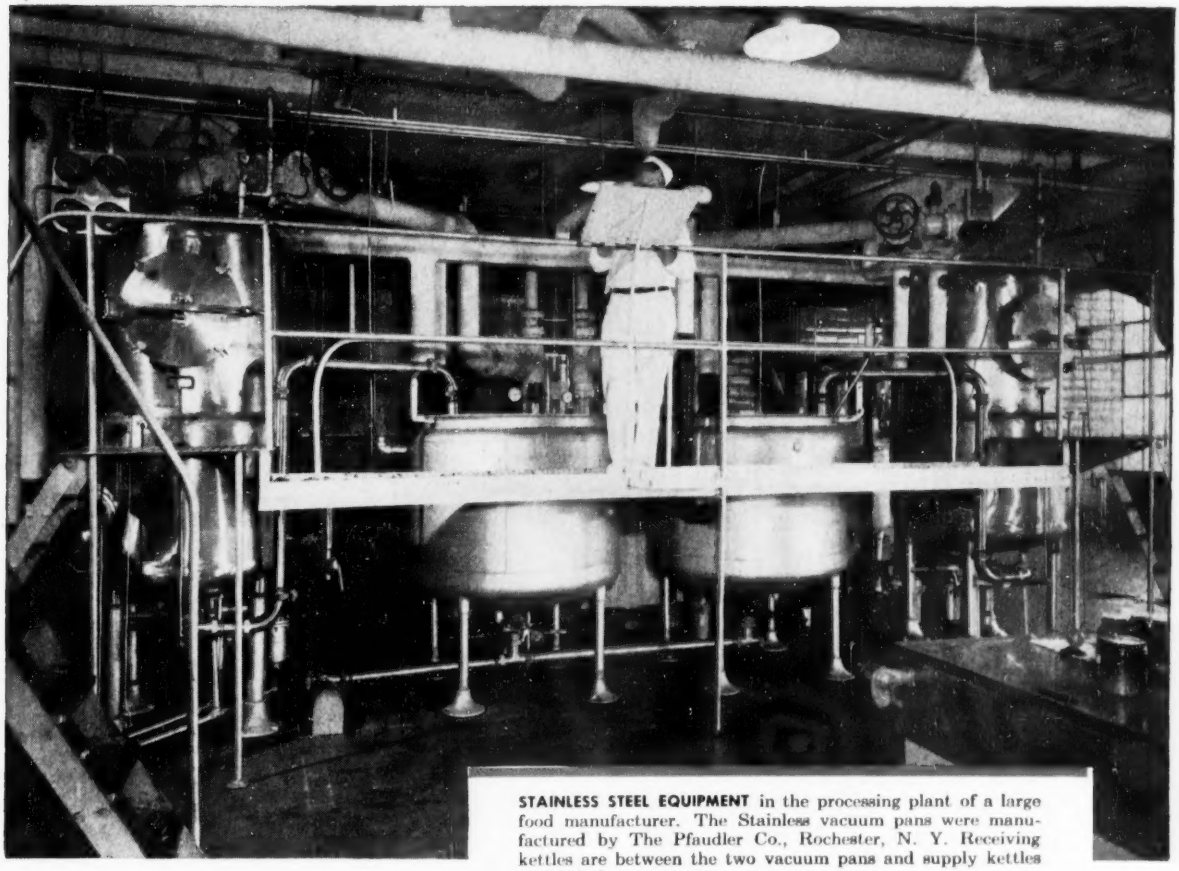
In Canada: Hoffmann-La Roche Ltd.
286 St. Paul Street, West, Montreal, Quebec

For efficient "vacuum pan" operation

YOU CAN'T BEAT STAINLESS STEEL



STAINLESS STEEL EQUIPMENT in the processing plant of a large food manufacturer. The Stainless vacuum pans were manufactured by The Pfaudler Co., Rochester, N. Y. Receiving kettles are between the two vacuum pans and supply kettles are behind.

BECAUSE Stainless Steel is strong and therefore can be used in the thin gages that permit efficient heat transmission, it has proved itself the ideal material for food processing by the "vacuum pan" or pressure kettle method.

A large food manufacturer uses this type of equipment in processing jams, preserves and marmalades under its private brand. Two sets of pressure-cooking equipment—each consisting of two steam-jacketed mixing and supply kettles, two vacuum pans and two holding kettles—turn out 100,000 pounds of these products per shift.

The vacuum kettles, charged with 2400 pounds of ingredients, are brought to 180°F., for cooking, then to 210° for sterilizing, and release the product at 195°. Vacuum ranges from 24½" to 27".

Strength is only one of the benefits of Stainless Steel for jobs like this. Its gleaming surface is easy to clean and easy to keep clean . . . there are no crevices to catch and hold food particles. It won't affect the taste or color of food and, in turn, is unaffected itself by food acids. It's made to order for handling food.

When you take advantage of these benefits of Stainless Steel, be sure your equipment fabricator uses U·S·S Stainless Steel. This perfected, service-tested material gives you the finest performance you can obtain.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
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U·S·S STAINLESS STEEL

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SHEETS · STRIP · PLATES · BARS · BILLETS
PIPE · TUBES · WIRE · SPECIAL SECTIONS

3-810

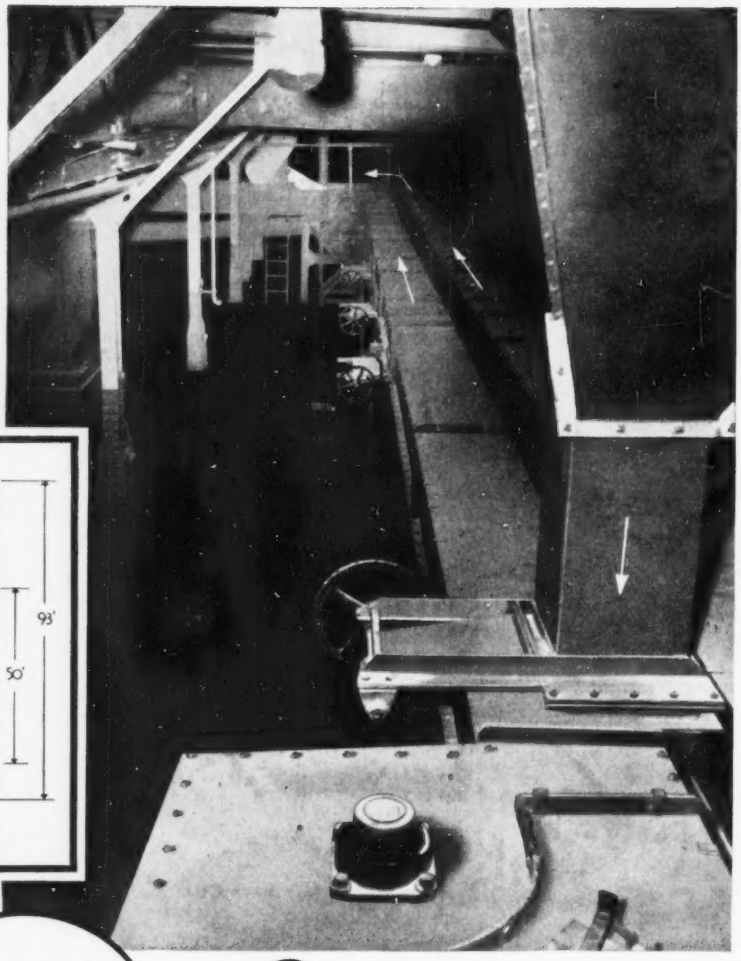
UNITED STATES STEEL

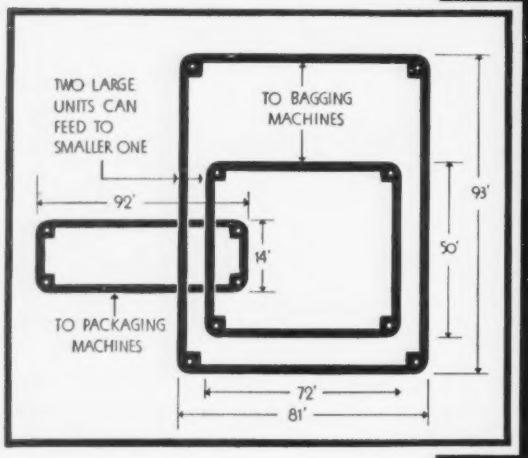
For more information, use coupon on page 213.

Part of two of the REDLER Systems. Notice their compact, fully sealed design.

GODCHAUX SUGARS, Inc., Reserve, Louisiana

Three 13" sidepull S-A REDLERS deliver finished sugar to bagging and packaging machines. They receive and discharge at many points along their lengths. Excess sugar not taken off at bagging and packaging stations recirculates around the sealed, continuous systems and prevents jamming. The two large REDLERS feed 100 lb. bagging stations, the smaller unit feeds stations for home size packages. The large units can feed into the smaller system when necessary.





S-A CONVEYING Systems

pass the sugar with never a jam-up

Belt Conveyors
Vibrating Conveyors
REDLER Conveyor-Elevators
ZIPPER Conveyor-Elevators
Screw Conveyors
Bucket Elevators
Pan Conveyors
Vibrating Screens
Bin Gates, All Types
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SEALMASTER Ball Bearing Units

Write Today for Full Particulars

Moving sugar continuously to bagging and packaging machines—without jamming or overloading when the machines can't keep up with the flow—calls for an efficient, flexible conveying system. Totally enclosed S-A REDLER Conveyors that allow for recirculation of excess sugar meet these requirements easily. Fully sealed, they also safeguard the sugar with absolute cleanliness.

No matter what *your* particular bulk handling problem, experienced S-A engineers, drawing upon the complete line of S-A equipment, can show you an economical answer. They've done it in thousands of other plants! Write for a meeting at your convenience.

STEPHEN S-A ADAMSON MFG. CO.

6 Ridgeway Avenue, Aurora, Illinois — Los Angeles, Calif., Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

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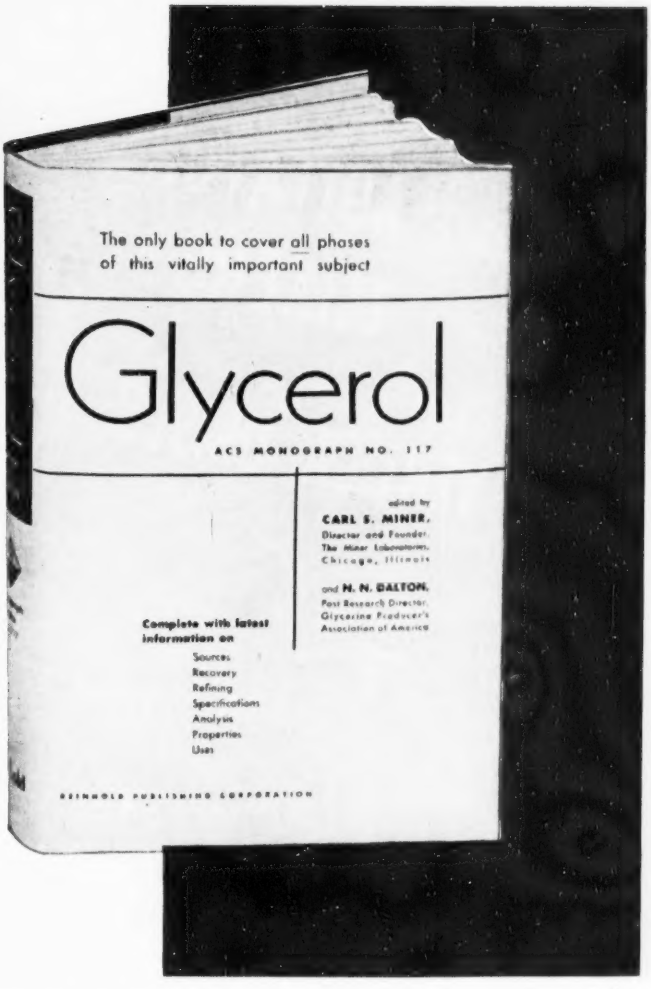

The ONLY book to tell the COMPLETE story on

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If you use a polyalcohol, this long-awaited reference book is indispensable.

An authentic American Chemical Society Monograph, the new book contains material contributed by the country's ablest producers and refiners of Glycerine, and is edited by Carl S. Miner and N. N. Dalton, nationally known authorities on Glycerine.

The monograph is sponsored by the Glycerine Producers' Association, and includes the latest information on natural and synthetic Glycerine, purification of Glycerine by ion exchange, and new equipment design. Chemists, purchasing agents, and executives will want to keep this new monograph handy for reference. It has easy-to-read tables of the most recent data on standards and specifications, physical and chemical properties.

For a free 10-day examination of the 475-page book, which sells for $12.00, write Reinhold Publishing Corporation, 330 West 42nd Street, New York 36, N. Y., publishers of the monograph.

If you need information regarding any specific Glycerine requirement, just write—

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   —*Truman M. Godfrey*
3. Methods of Production
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4. Recovery and Refining
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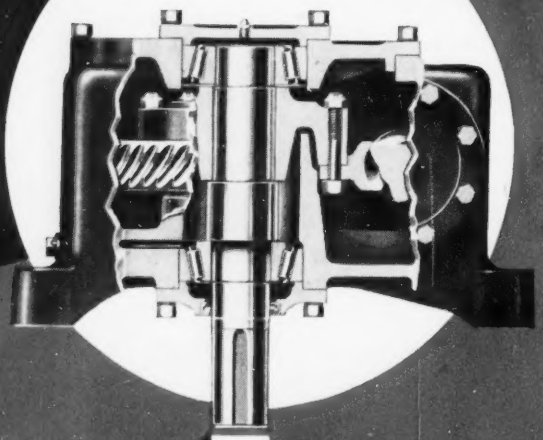
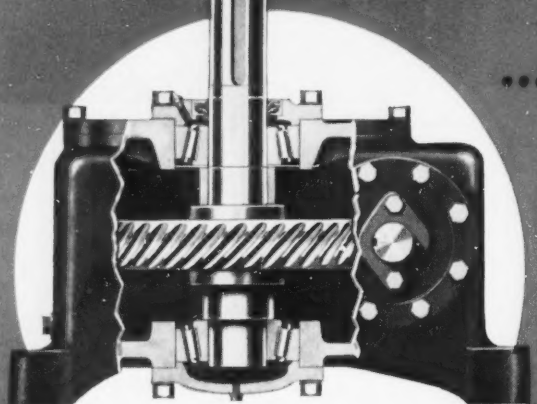


SHAFT UP
OR
SHAFT DOWN



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Matching high quality with distinctive design, these Philadelphia units offer a combination of construction features not found in any other worm gear reducer. Indicative of these unusual advantages is the famous "dry well" construction of the shaft-downward type. This feature completely eliminates the necessity of depending on a stuffing box or oil seal to prevent oil dripping down the shaft.

Send for our 88 page *Worm Reducer Catalog* . . . it gives complete descriptive, ordering and installation data.

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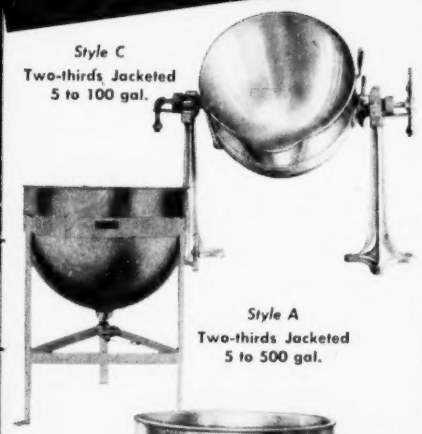
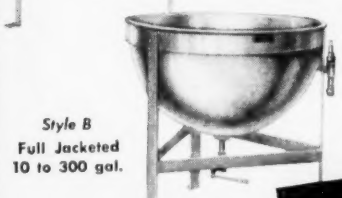
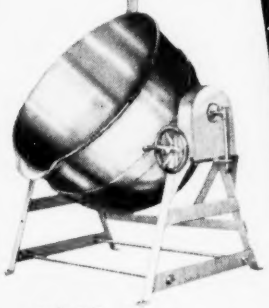


Style C
Two-thirds Jacketed
5 to 100 gal.

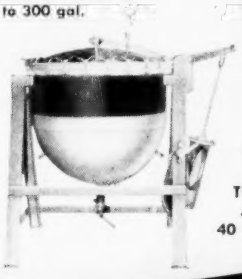
Style A
Two-thirds Jacketed
5 to 500 gal.



Style B
Full Jacketed
10 to 300 gal.

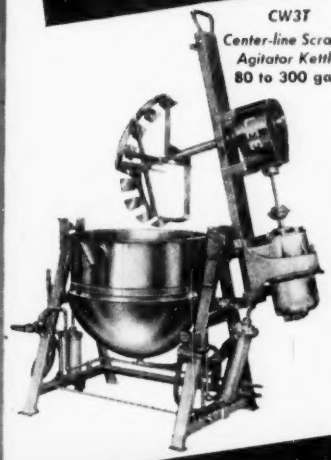


Style CW
Two-thirds Jacketed
80 to 300 gal.

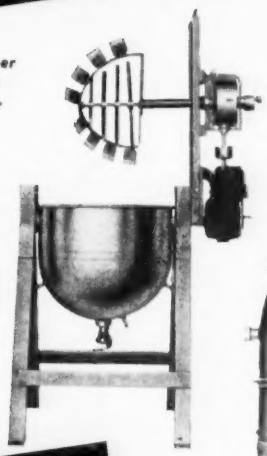


Pressure Kettle
Two-thirds Jacketed
40 to 200 gal.

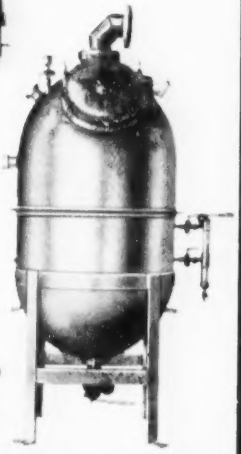
MIXING AND BLENDING UNITS



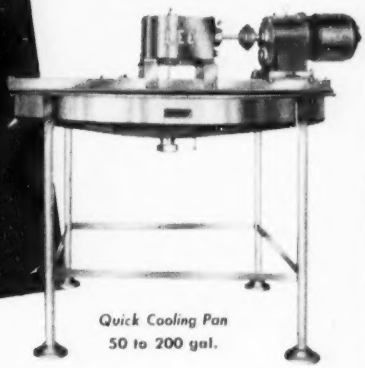
CW3T
Center-line Scraper Agitator Kettle
80 to 300 gal.



A3T
Center-line Scraper Agitator Kettle
25 to 300 gal.



Vacuum Pan
50 to
500 gal.



Quick Cooling Pan
50 to 200 gal.

these LEE Units

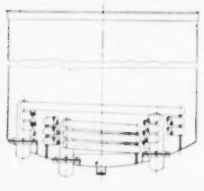
WILL REDUCE YOUR PROCESSING COSTS!

Individually designed for a specific processing operation and available in a wide range of sizes to fit your exacting requirements, Lee corrosion-resistant equipment is built to give you long years of peak performance with minimum maintenance.

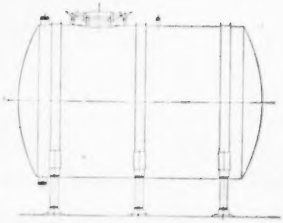
Descriptive bulletins are available for any or all of the above units. Write for them today and discover how Lee can help reduce *your* processing costs.

MIXING, COOKING & STORAGE TANKS

Mixing Tank
25 to 500 gal.



Pulp Tank
500 to 2,000 gal.



Storage Tank
100 to 5,000 gal.

LEE METAL PRODUCTS CO., INC.

416 PINE STREET,
PHILIPSBURG, PA.

ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE

Harnessing heat for all industry

HEAT is one of man's most useful servants. With it, he can separate gasoline from crude oil . . . cook food . . . generate electricity . . . refine steel from raw ore and roll it into mile-long sheets. But to do these and countless other jobs, heat must be applied in the correct amounts . . . to obtain critical temperature values.

Forward-looking research and production men realized some years ago that "rule of thumb" was entirely inadequate for replacing complex processes. They needed facts obtainable only from automatic measurement . . . performance possible only through automatic control.

Honeywell has consistently led the way toward new and better temperature instrumentation. Continuing research has developed sensing elements which cover the full temperature spectrum . . . instruments which provide the desired accuracy . . . and automatic controls which can regulate any production process.

instruments

The complete Honeywell family offers a broad choice of characteristics to suit individual applications. *ElectroniK* indicators, circular chart and strip chart recorders and controllers afford the peak in performance through "Continuous Balance" high-speed electronic measurement. *Pyr-O-Vane* millivoltmeter instruments fit many processes which need accurate indication and control. Brown Thermometers are economical instruments for recording and controlling moderate temperatures.

controls

With *Pyr-O-Vane* instruments you can have electric control of either the two-position, three-position or time-proportioning types.

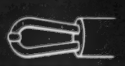
With Thermometers, you may choose from electric two-position, pneumatic on-off or proportioning control, and cam-operated program control.

With *ElectroniK* instruments, your selection covers practically any form of electric or pneumatic control, including the most advanced types suitable for complex processes, and the most flexible program controls.

New ways to cut —*through*

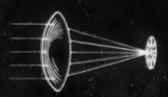
sensing elements

thermocouples



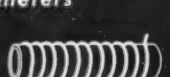
the most versatile of temperature elements, are supplied for ranges from −300 to +2800° F.

Radiamatic



(radiation-type) elements are applicable to direct measurement of work temperature . . . to moving objects . . . to extremely high ranges and other jobs impossible for any other element.

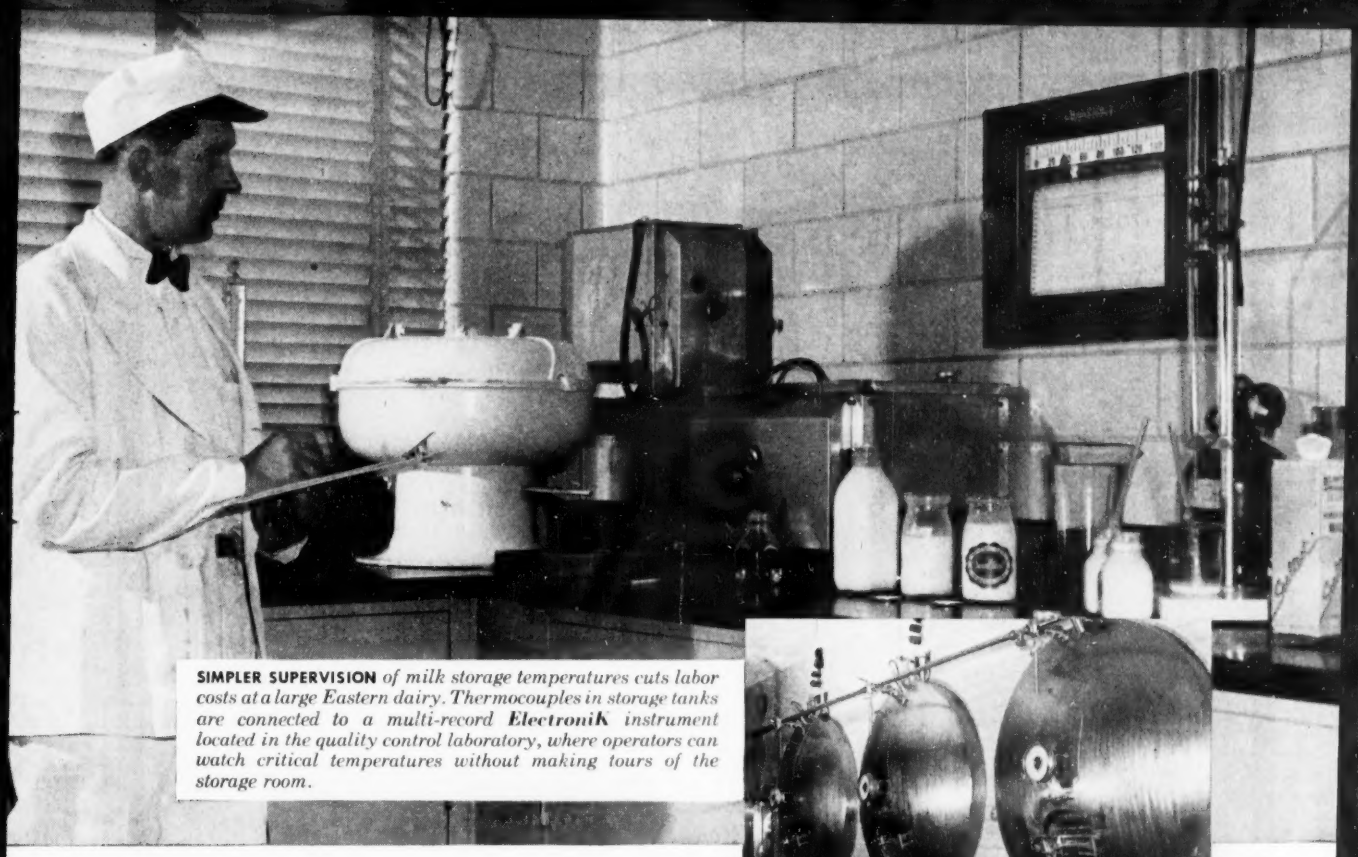
resistance thermometers



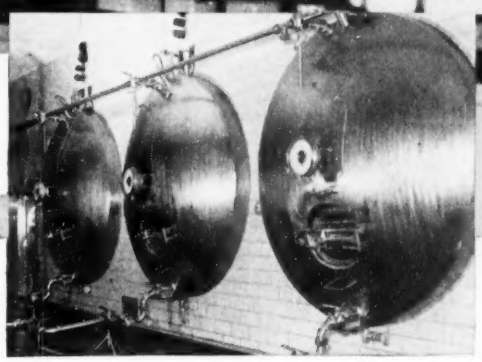
are recommended for highest accuracy from sub-zero to 300° F. and for narrow spans.

thermometer bulbs

rugged, sensitive elements for moderate temperatures.



SIMPLER SUPERVISION *of milk storage temperatures cuts labor costs at a large Eastern dairy. Thermocouples in storage tanks are connected to a multi-record* ***ElectroniK*** *instrument located in the quality control laboratory, where operators can watch critical temperatures without making tours of the storage room.*



processing costs *Honeywell instrumentation*

PROGRESSIVE food plants are finding modern instrumentation by Honeywell a sure-fire means of holding the cost line. Almost invariably, these controls not only fulfill the cost-cutting job for which they were principally intended, but also produce related savings in maintenance, materials or labor.

Take the experience of a big Eastern dairy, as an example. By installing a multi-point *ElectroniK* temperature recorder, they brought all milk storage temperatures to one central point . . . eliminated hours of labor for checking and logging of individual storage tank temperatures. But savings didn't stop there. The sanitary thermocouples that work with the *ElectroniK* instrument greatly simplified tank cleaning . . . reduced maintenance and repair expense.

In scores of other plants, Honeywell instrumentation makes possible more efficient utilization of labor and equipment . . . reduction of product loss . . . non-stop operation at peak capacity. Your local Honeywell engineering representative will welcome the opportunity to discuss how your plant can realize these same benefits. Call him today . . . he is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4502 Wayne Ave., Philadelphia 44, Pa.

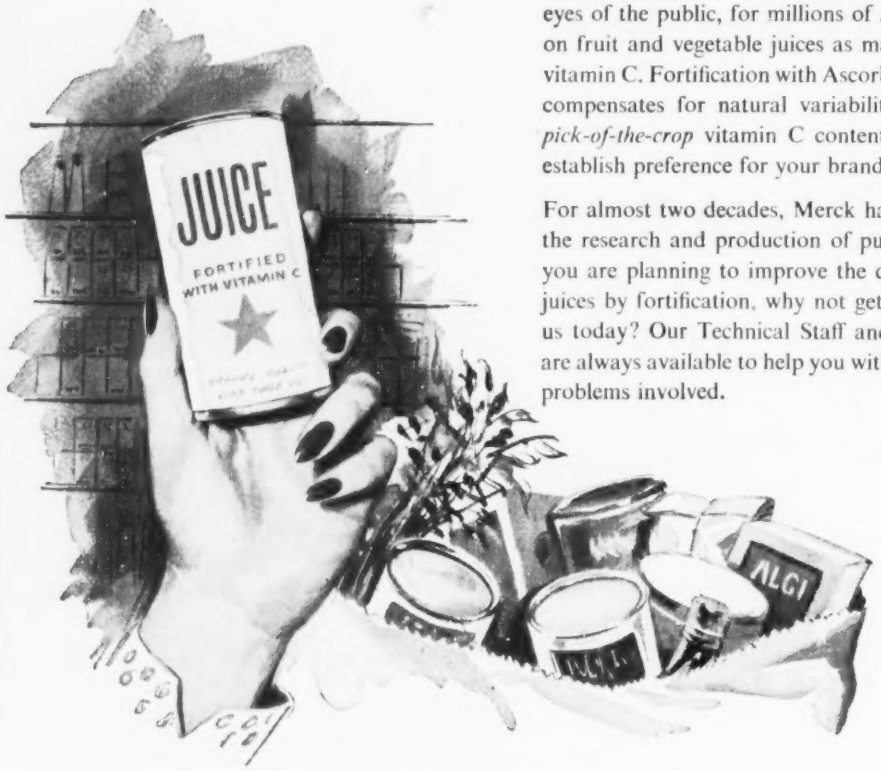
● **REFERENCE DATA:** Write for Composite Catalog No. 5000, and for Instrumentation Data Sheets on specific food industry applications.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

For increased consumer appeal

Fortification gives your pack

"Pick-of-the-Crop" Vitamin C content



Fortification possesses definite sales appeal in the eyes of the public, for millions of Americans rely on fruit and vegetable juices as major sources of vitamin C. Fortification with Ascorbic Acid Merck compensates for natural variability and assures *pick-of-the-crop* vitamin C content, thus helping establish preference for your brand.

For almost two decades, Merck has pioneered in the research and production of pure vitamins. If you are planning to improve the quality of your juices by fortification, why not get in touch with us today? Our Technical Staff and Laboratories are always available to help you with any technical problems involved.

Ascorbic Acid (VITAMIN C) Merck U.S.P.

FOR FORTIFICATION AND PROCESSING

Research and Production for the Nation's Health

MERCK & CO., INC.
Manufacturing Chemists
RAHWAY, NEW JERSEY
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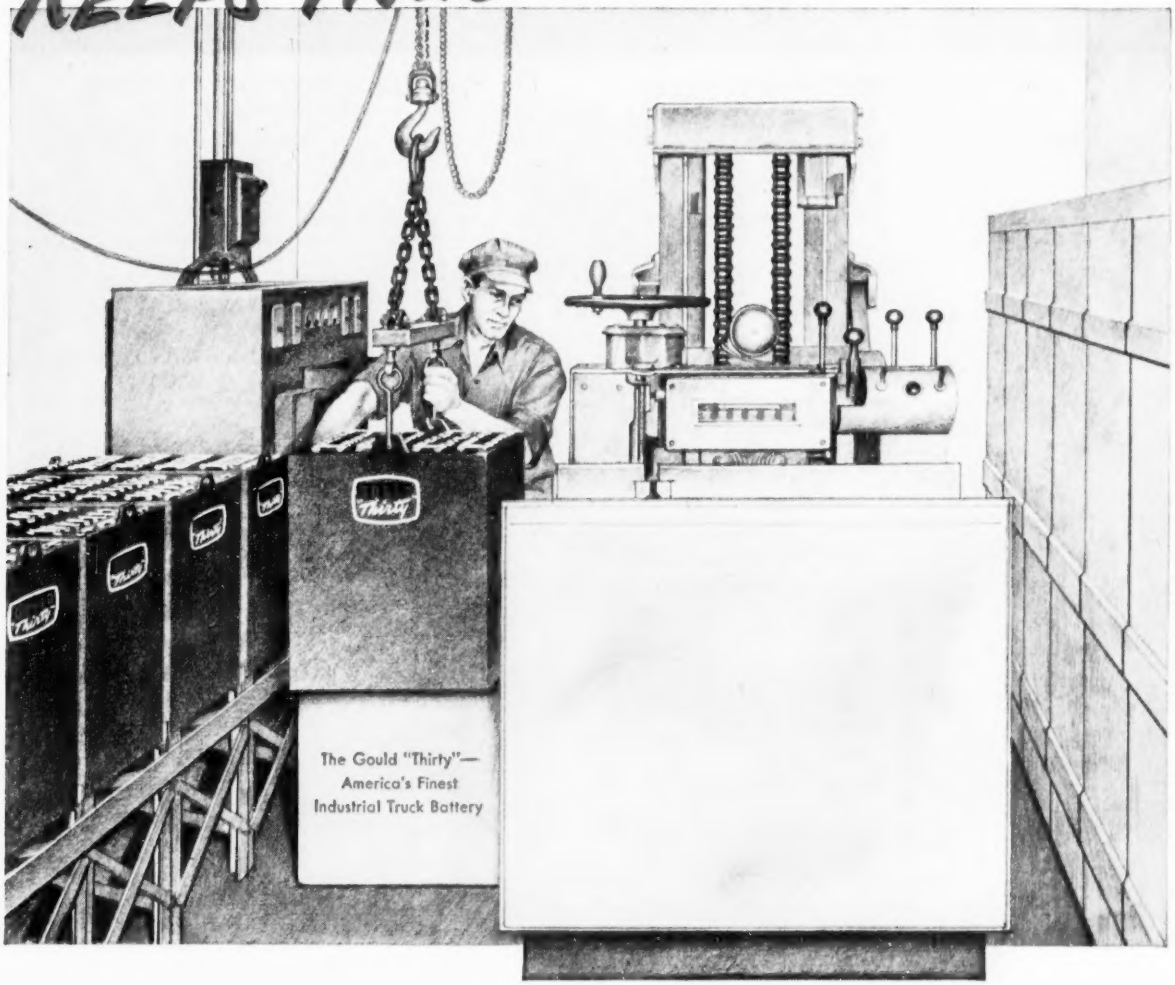
SYSTEMIZED BATTERY CARE

KEEPS TRUCKS ON THE GO!



Nothing will keep your electric industrial trucks in continuous operation like a well-organized system of battery maintenance. And nothing can give you such a system like the Gould Plus-Performance Plan. Here is a complete library of technical information that tells how to select, charge, handle, maintain, and determine the condition of lead-acid batteries, regardless of make. Use it to systemize battery care and you'll cut down-time, maintain production schedules and extend battery service. It's free. Write Gould Battery Information Headquarters.

GOULD *Industrial Batteries*

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, N. J.

Always Use Gould-National Automobile and Truck Batteries

For more information, use coupon on page 213.

HERE'S WHAT WE MEAN BY *Quality* IN "Buffalo" AIR CONDITIONING UNITS

HIGH EFFICIENCY FANS

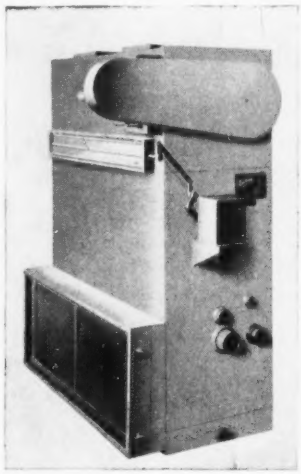
Effective air conditioning depends on effective distribution of the conditioned air. This is one reason why "Buffalo" put so much care into the design of its new mixed-flow fans with the bellmouthed housings. Quieter and more efficient than forward-curved designs, they have extremely stable performance over a wide range of capacity. A further development, the oversize hollow shafts, assure perfect balance and non-pulsating operation, eliminating the critical speeds of long shafts.

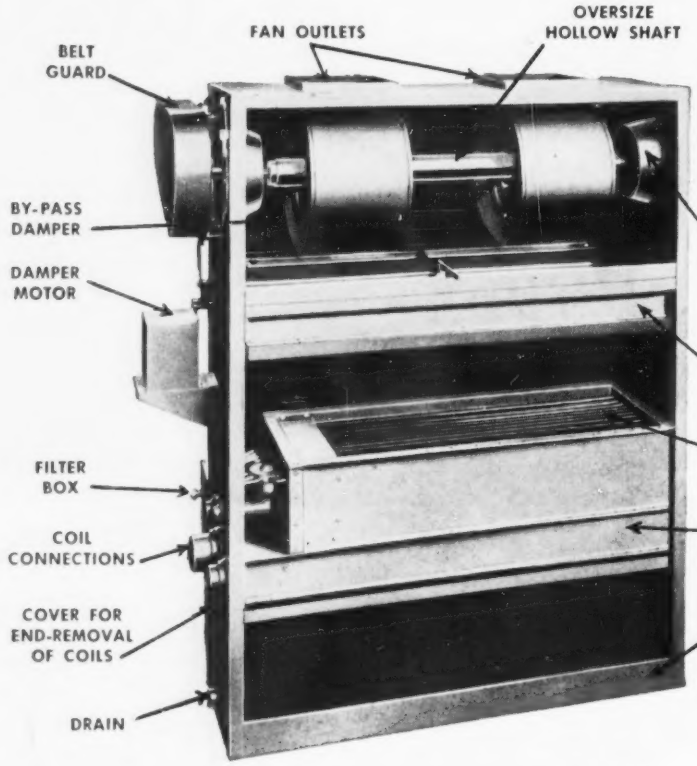
QUALITY COOLING COILS, HEATING COILS, DAMPERS

The coils are the well-known lightweight Aerofin, in standard trade sizes,—assurance of satisfactory service. For exact control, "Buffalo" offers motor-operated automatically controlled by-pass dampers in four styles to suit the installation.

OTHER IMPORTANT FEATURES TO CONSIDER

"Buffalo" units have removable panels for accessibility and easy maintenance. They may be broken down into sections for moving into your building through standard doorways. Parts are interchangeable. External bearing bowl permits lubrication from outside. For these and other quality features that mean dependable air conditioning at moderate cost, write now for Bulletin 3703A.





"Buffalo" Model "G" Type "VPC" Cabinet with Front Panels Removed

DIAMOND JUBILEE 75TH ANNIVERSARY

"Buffalo" FIRST FOR FANS

BUFFALO FORGE COMPANY

152 MORTIMER ST. BUFFALO, NEW YORK

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Sales Representatives in all-Principal Cities

VENTILATING | PRESSURE BLOWING | AIR CLEANING | COOLING | AIR TEMPERING | HEATING | INDUCED DRAFT | FORCED DRAFT | EXHAUSTING

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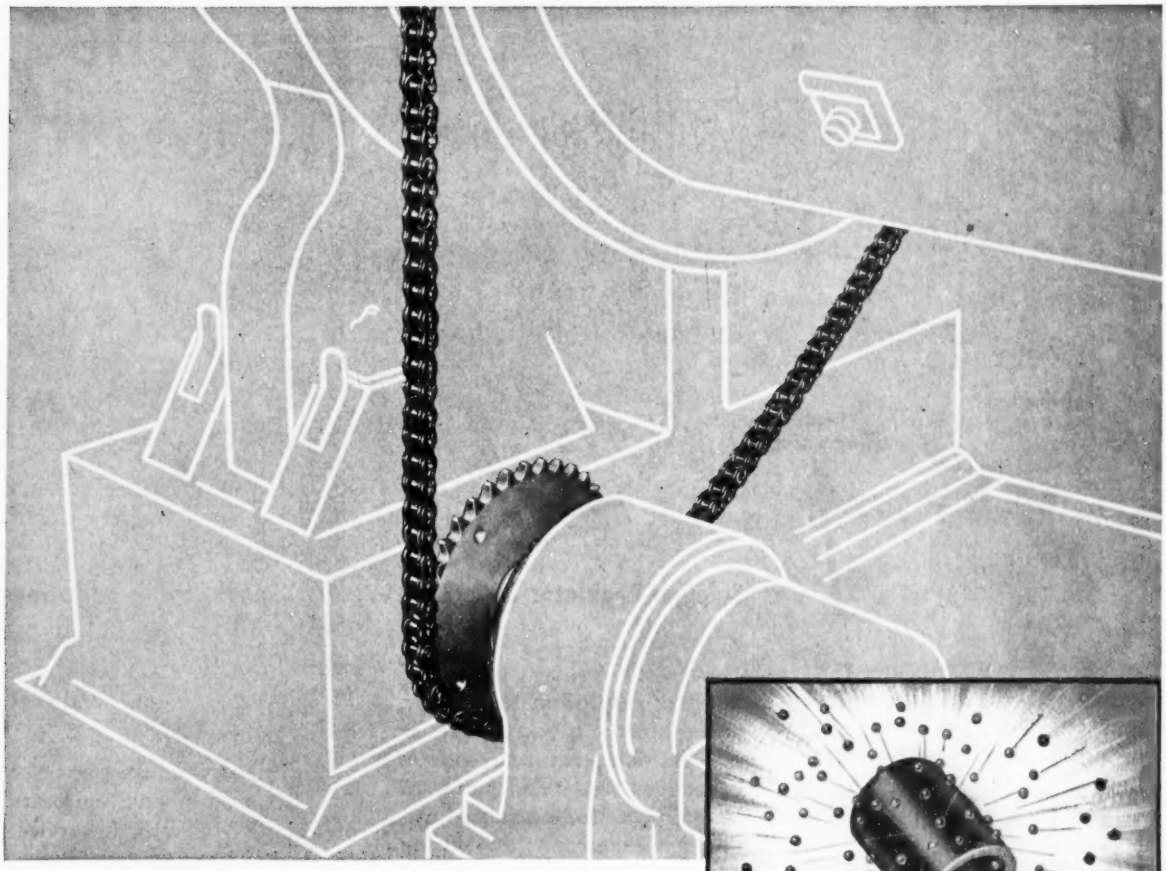
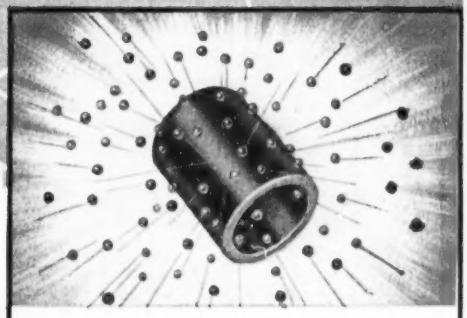
There's EXTRA LIFE built into LINK-BELT roller chain





Look for the distinguishing darkened rollers. Thousands of tiny steel balls hammer the metal—"cold work" each roller . . . pay off in extra fatigue life . . . added ability to withstand shock and impact of today's heavier loads.

Shot-peened rollers are just one of many engineering extras you get from LINK-BELT

WHETHER it's for drive or conveyor service, every Link-Belt Roller Chain gives you a performance bonus. In addition to shot-peened rollers, lock-type bushings multiply capacity to withstand shock loading. And closer heat-treat control, rigid testing and thorough inspection pay off in greater uniformity . . . extra years of life. Link-Belt Precision Steel Roller Chain is built in single or multiple widths, ⅜" through 3" pitch. Double pitch 1" through 3". A call to your nearby Link-Belt office will bring you prompt, expert service. Send for Engineering Data Book No. 2157.

18,119-A

LINK-BELT

ROLLER CHAIN & SPROCKETS

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities.

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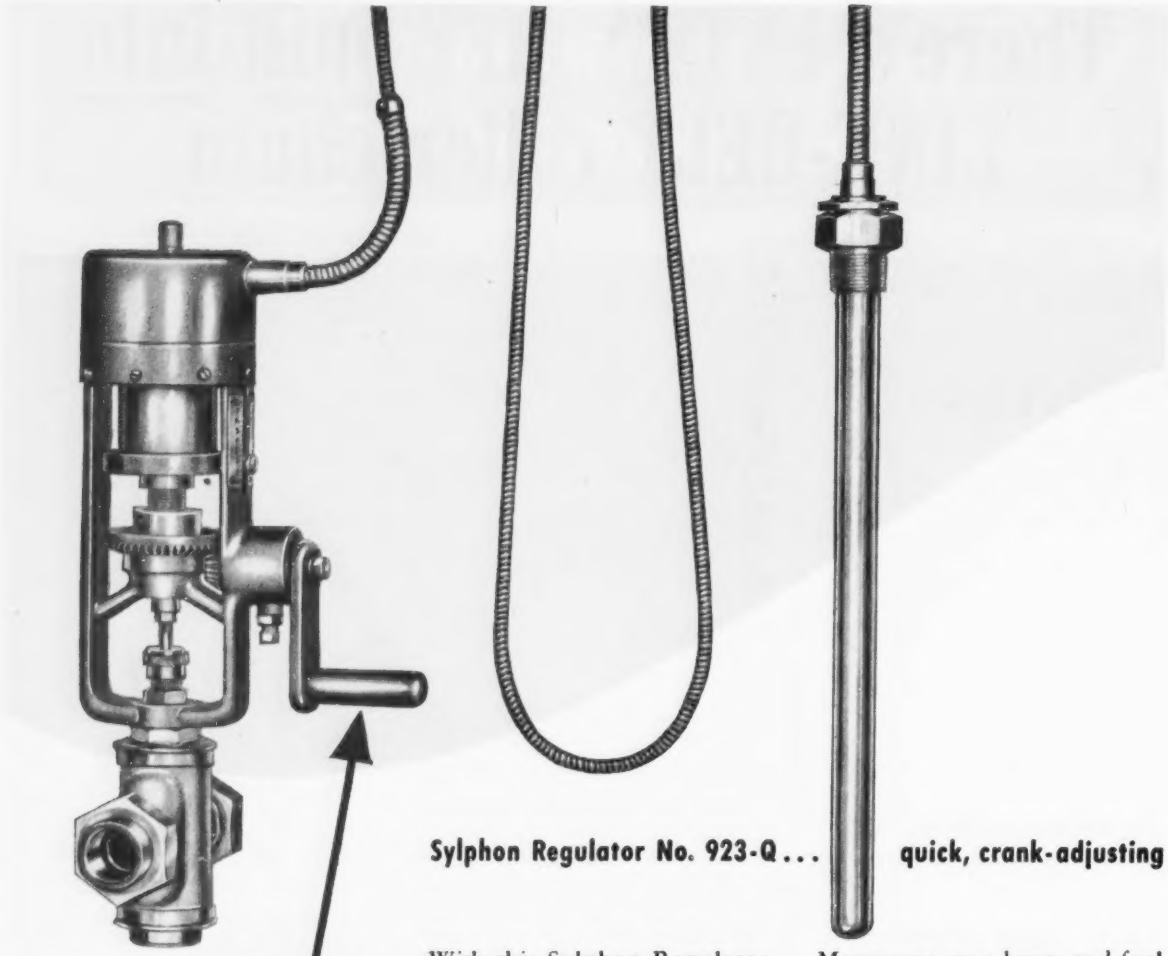

Sylphon Regulator No. 923-Q . . . quick, crank-adjusting

MAKES TEMPERATURE TO ORDER ...FAST!

With this Sylphon Regulator, you can make quick changes in process temperatures—control operations faster and better. A simple turn of the crank adjusts the temperature to the setting desired. It's much easier and more accurate than conventional hand-wheel type regulators, especially for batch processing.

You get *more* advantages with this Sylphon Regulator. Because it provides dependable, accurate temperature control, you are assured of uniform processing conditions. Wasteful overheating is prevented. Spoilage is reduced. Manpower, man hours and fuel are saved.

Sturdy, neat and compact, No. 923-Q is built to give you years of trouble-free, reliable service. Used with open and closed tanks, bottle washers, glue kettles, dish-washing machines, slashers and other processing units. Ideal as standard equipment.

Write for information about Regulator No. 923-Q—or about other Sylphon Regulators that meet temperature control requirements for any industrial need. Ask for Catalog GG-A.

"Everything's Under Control"

Temperature Controls • Bellows Devices • Bellows Assemblies

FULTON SYLPHON
DIVISION

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Canadian Representatives, Darling Brothers, Montreal

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"Naturally," Food Sells Better...

When You Sell

NATURAL FRESH FLAVOR

intensified by Zest®

ZEST brings out the true garden-fresh flavor that nature put *into* your vegetables . . . prevents the gradual "flavor-fading" that may be robbing your brand of profit-making taste appeal. Step up quality with fuller flavor. Add ZEST, Staley's 99+% pure monosodium glutamate, to your canned and frozen vegetables, soups, fish, stews, poultry . . . and scores of other foods.

ZEST intensifies natural flavor *already in* your foods without adding flavor, aroma or color of its own. Freezing reduces the level of amino acids. ZEST restores this loss. ZEST is effective in tiny amounts either before, during or after processing. After using ZEST, food processors instantly notice a marked flavor improvement. Write today for all the details about the seasoning that makes foods sell better!

Zest®

PRODUCTS FROM CORN
Staley's

Staley's 99+% Pure Monosodium Glutamate

A. E. Staley Manufacturing Co., Decatur, Illinois

Mail this coupon for the complete ZEST story.

A. E. Staley Mfg. Co.
Dept. FE-4, Decatur, Illinois

Gentlemen: Send me all the facts about ZEST—the amazing seasoning that boosts natural food flavors.

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Address _____

City _____ *Zone* ____ *State* _____

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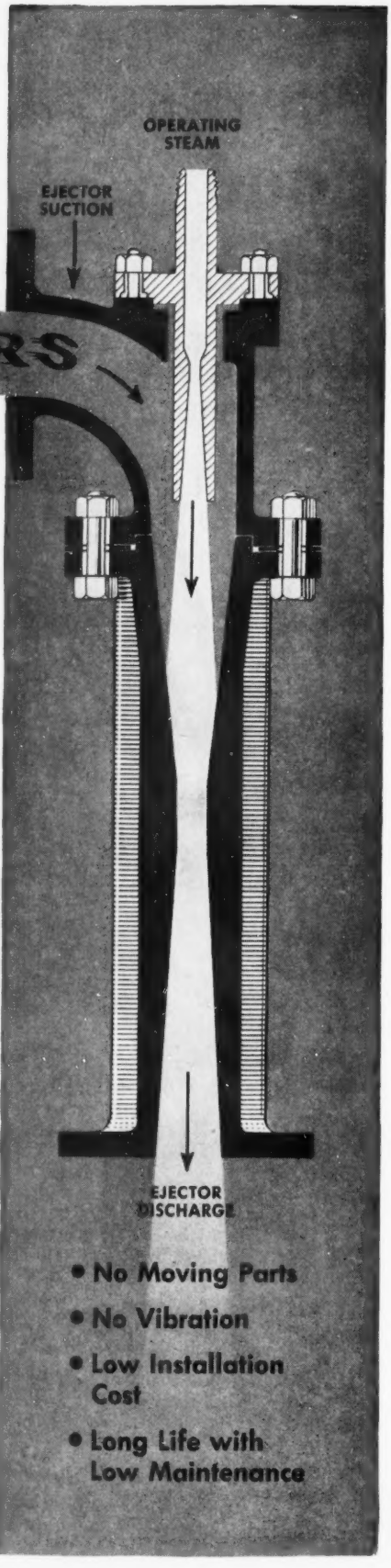
for low-cost suction pressures

EVACUATE BY STEAM

with

I-R STEAM-JET EJECTORS



Where processes call for vacuum pressures down to 50 microns (.002″ Hg abs), the I-R Steam Jet Ejector can generally make important savings in first cost, installation, operation and maintenance.

The steam jet ejector is the ultimate in mechanical simplicity, consisting of only three basic parts—a steam nozzle, a suction chamber and a venturi-shaped diffuser. There are no moving parts to wear out or require lubrication—no vibration—nothing to adjust or replace. Little or no foundation is required and space requirements are very moderate.

Ingersoll-Rand can supply Steam Jet Ejectors, designed for any capacity requirements within their vacuum pressure range. They will handle wet or dry mixtures of air, gases and vapors, and accidental entrainment of liquid will do no damage. I-R Ejectors are available in single-stage, two-stage, and multiple-stage designs—with pre-coolers, intercondensers and after condensers as required for any specific application.

Remember, I-R engineers are specialists in vacuum-producing equipment—including both steam-jet ejectors and reciprocating vacuum pumps. Their recommendations for *your* vacuum equipment are therefore based solely on your own best interests. For further information, consult your nearest I-R representative. Or write for a free copy of Bulletin 9013A.

Ingersoll-Rand

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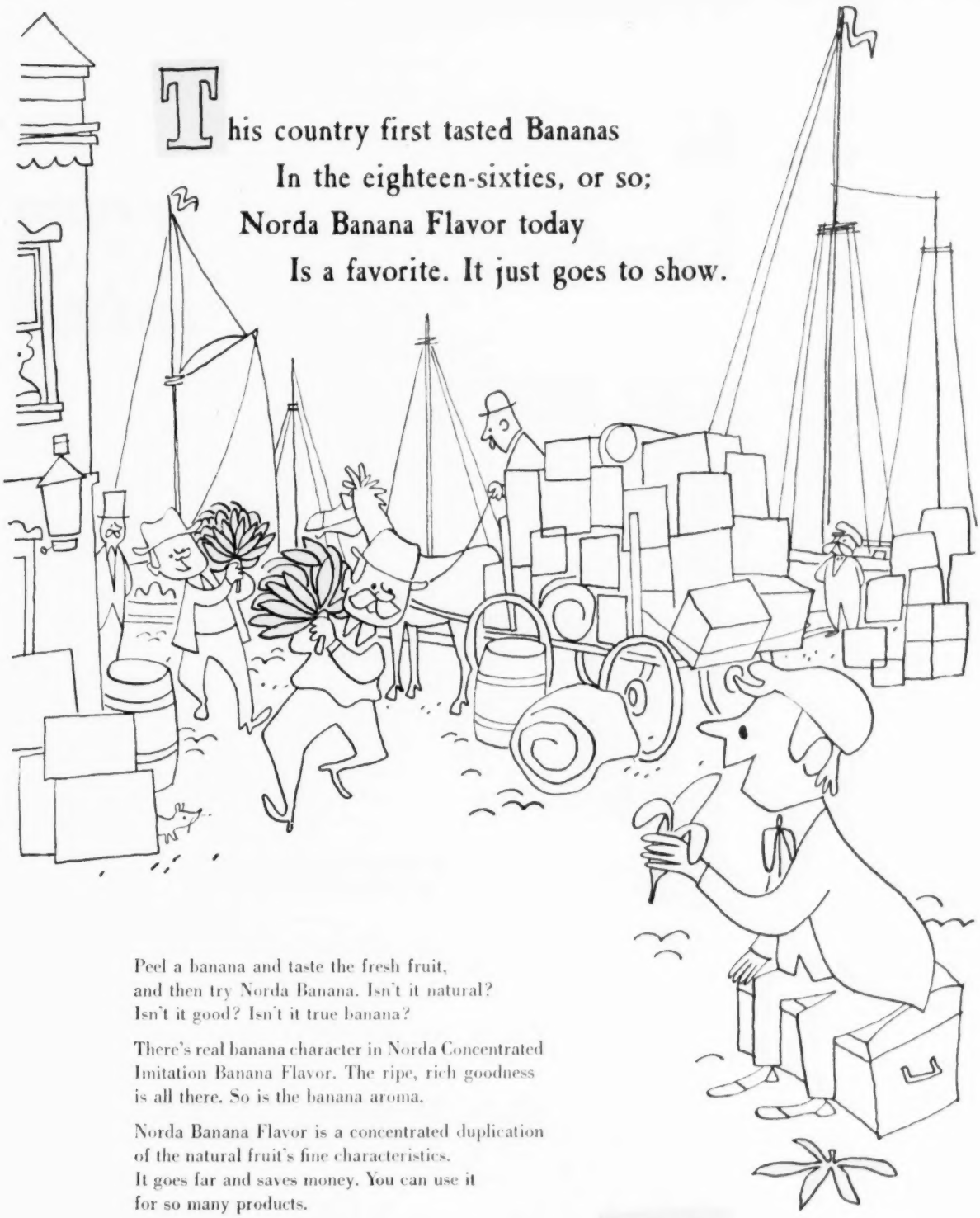

This country first tasted Bananas
In the eighteen-sixties, or so;
Norda Banana Flavor today
Is a favorite. It just goes to show.

Peel a banana and taste the fresh fruit, and then try Norda Banana. Isn't it natural? Isn't it good? Isn't it true banana?

There's real banana character in Norda Concentrated Imitation Banana Flavor. The ripe, rich goodness is all there. So is the banana aroma.

Norda Banana Flavor is a concentrated duplication of the natural fruit's fine characteristics. It goes far and saves money. You can use it for so many products.

Norda wants you to test, try, and taste it. Send for generous free samples.

Use "A Favorite to Flavor It" . . . A Norda Flavor

Norda

ESSENTIAL OIL & CHEMICAL COMPANY, INC.
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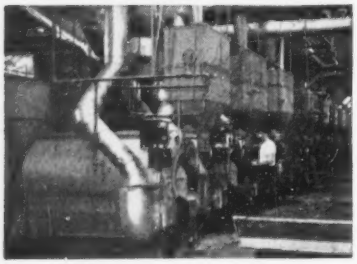
VOLUME food processing WITH GAS

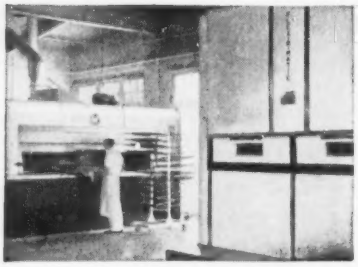


COFFEE ROASTING

Fast, uniform roasting is assured with this battery of 9 Gas-fired batch roasters, which has an annual output of 25,000,000 pounds. Gas does this job uniformly, economically and dependably.

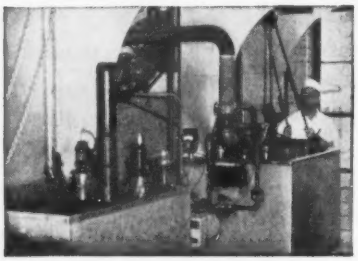
MEAT CURING

Gas burners char Hickory sawdust in this 3-story smoke house to generate aromatic smoke for curing and smoking of hams. Gas is the ideal fuel for food processing because Gas is clean, efficient, and affords precise temperature control.



VARIETY BAKING

Versatility of Gas and Modern Gas Equipment is evident in volume variety baking of rolls, breads, cakes, pies, etc. Precise, automatic temperature control for perfect baked goods is available with dependable Gas.



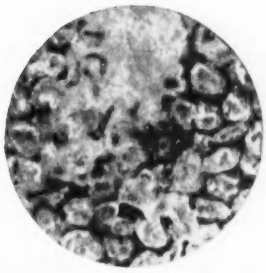
FOOD SPECIALTIES

These immersion tank units used for blanching nuts are typical of the Modern Gas Equipment available for special food processing. Wherever heat is needed to process foodstuffs, you will find that Gas is the dependable, clean, economical fuel to use. Get the facts about GAS today, from your Gas Company Representative.

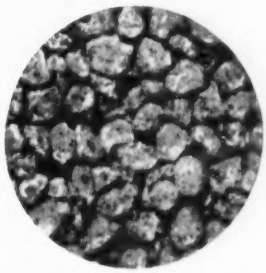
MORE AND MORE
THE TREND IS TO GAS
FOR HEAT PROCESSING OF FOODS

AMERICAN GAS ASSOCIATION • 420 LEXINGTON AVE., NEW YORK 17, N.Y.

IN STORAGE . . . **OR IN TRANSIT . . .**



(ABOVE) Conventionally mixed material showing typical smears of unmixed materials. *(BELOW)* Simpson mixed material showing complete uniformity of mix—which will remain in that form even in transit, or after long storage periods.

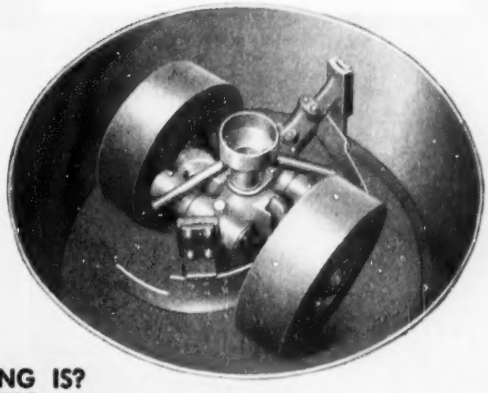


SIMPSON MIXED MATERIALS STAY MIXED

THIS you can depend on. Once materials are mixed in a SIMPSON Mix-Muller *they stay mixed!* Even after prolonged storage . . . or bouncing around in transit . . . where *conventionally mixed* materials tend to *segregate* or *stratify* . . . Simpson-mixed materials retain their *constant stability.*

Segregation can occur only where materials have been improperly mixed . . . where individual grains have merely been placed *next to each other.* Contrast this to *mulling* in a Simpson Mix-Muller, where *each* grain is subjected to a kneading, smearing, mulling action which actually *blends* component materials into *one* . . . where blending is intimate, thorough and uniform.

In addition, SIMPSON Mix-Mullers require less labor, less horsepower, and are safer to operate. You can obtain more information from a National Engineer. *Write for details today.*



DO YOU REALLY KNOW WHAT MULLING IS?

Watch the practiced technique of a chemist's mortar and pestle — the intensive rubbing and smearing actions — and basically, *THAT'S MULLING!*

Mulling with a SIMPSON Mix-Muller utilizes a special pair of revolving mullers and plows mounted on a stationary pan. The mullers are adjustable and are supported by rocker arms. This leaves the mullers free to ride on the material creating a true mulling action as they revolve. The results are thorough, more accurate blending . . . unaffected by rough handling in transit, or in long storage periods.

SIMPSON Mix-Muller® Division

NATIONAL ENGINEERING CO. 604 Machinery Hall Bldg., Chicago 6, Ill.

For more information, use coupon on page 213.

keep your lines UP... cleaning costs WAY DOWN with CHERRY-BURRELL C-I-P fittings

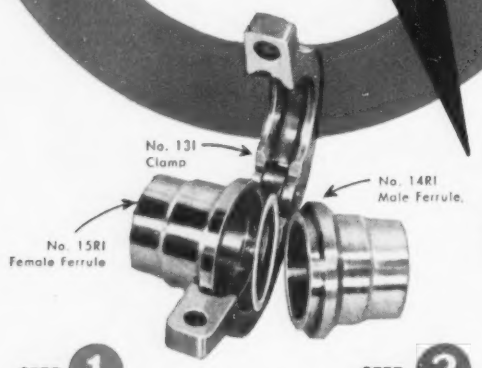
You can cut clean-up time 32 to 50% and save on both installation and maintenance with the new Cherry-Burrell stainless steel Cleaned-In-Place (C-I-P) Pipelines and Fittings.

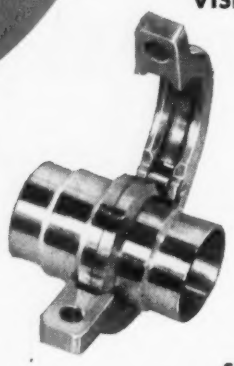
Cleaner Lines in Less Time: No time lost taking down lines. You clean them "in place" with high velocity, uniform hydraulic scrubbing. No recontamination from air borne bacteria or from handling.

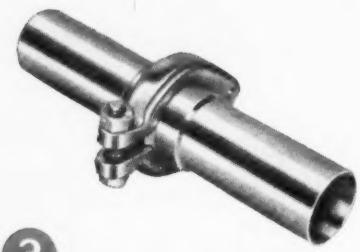
Save Installation Time and Cost: Fewer parts to handle, 21-foot pipe sections eliminate need for many unions. Vise-like strength of Cherry-Burrell union does away with pipe hangers and supports.

Less Maintenance: Lines not frequently dismantled are less likely to be dropped, dented, scored.

CHERRY-BURRELL C-I-P CLAMP FORMS VISE-LIKE UNION — IN SECONDS





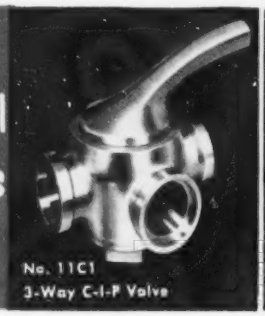


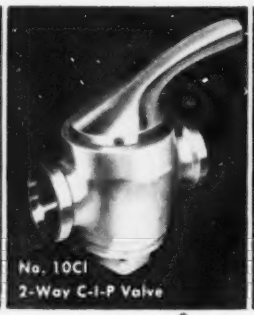
STEP 1 Self-centering "Teflon" gasket placed in female ferrule. "Teflon" gasket is non-toxic, non-absorbent, impervious to fats, acids and alkali.

STEP 2 Male and female ferrules assembled with gasket in place. Matching 37° clamping angle on ferrules and clamps. Ferrule seats machined to close tolerance. Gasket cannot get out of alignment, swell or creep.

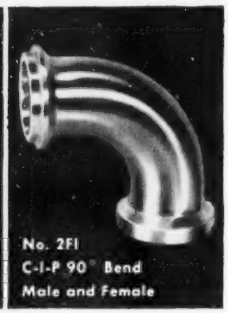
STEP 3 Ferrules, with metal-to-metal stop, form union with predetermined squeeze point on gasket. No gasket "mushrooming." No cracks, crevices or extrusions to harbor bacteria. Tests prove this union will contain pressures up to 250 p.s.i.

typical Cherry-Burrell C-I-P fittings


No. 11CI
3-Way C-I-P Valve


No. 10CI
2-Way C-I-P Valve

No. 2CI
C-I-P 90° Bend


No. 2FI
C-I-P 90° Bend
Male and Female

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LARGEST brewery-owned grain elevator towers over north Milwaukee area. Its 72 concrete bins hold 3½ million bushels—a half year's supply of barley for the brewery. Headhouse is 290 ft. tall, has 13 working floors.

Schlitz Defeats Dust

All-out control is applied in new elevator. Complete air collection, centralized dust house, direct-equipment hook-ups are features

LLOYD E. SLATER
Associate Editor, "Food Engineering"

In planning its recently completed 3,500,000-bu. grain elevator, the Jos. Schlitz Brewing Co., Milwaukee, had in mind the most modern facility of its type in the world. But one aspect particularly absorbed its planners: How to include 100-percent efficient dust control.

To this brewer, dust was more than a mere housekeeping nuisance. Top-notch neighbor relations could easily be soured by a blanket of wafting powder. Also, the efficient reclaim of fines from grain could mean a tidy return as a feed component.

But ever-dominant was the factor of safety. It was desired to completely abolish the dust-explosion hazard by removing its cause—dust itself.

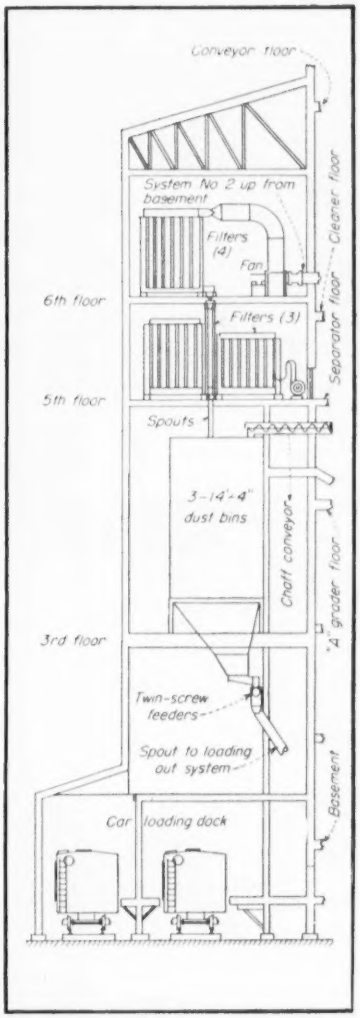
To secure this end, the company just about designed its facility around a dust control system. Its floor plan, ceiling heights, equipment sites—all were planned with an eye toward maximum efficiency in dust handling.

As engineers from the system supplier, the Day Co., put it, "Schlitz went all out in this project. To our mind they have installed the finest and most complete dust recovery system yet in use. And actually, in working with the brewer's engineers on the layout, we were able to advance our own concepts and equipment because of the complete and unrestricted freedom the company encouraged in final design."

Before detailing some of the advanced dust-control features which make this installation unusually worthy of report, a word or two about the outstanding grain elevator itself:

Essentially, its 72 concrete storage bins, 147-ft.-high, have a total capacity of 3,500,000 bu. and are primarily to hold barley. This takes care of about a half-year's supply of this prime ingredient for the brewery. However, other grain adjuncts are also stored and handled at this elevator.

The headhouse at the end of the 439-ft. length of bins is an unusually high 297 ft.—said to be the second tallest building in Wisconsin. It is spaciously arranged into 13 working floors, although the building code lists it as 31 stories high. Its poured concrete construction features walls 9 in. thick.

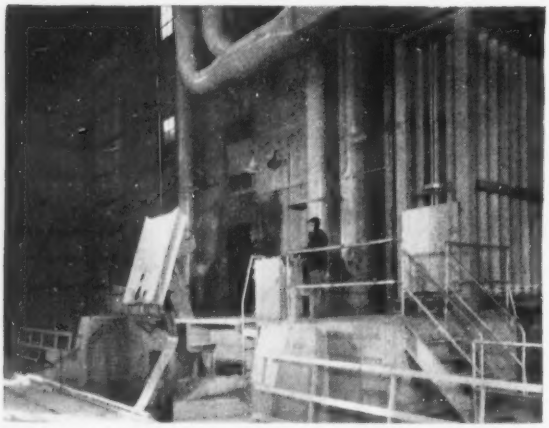


DUST-HOUSE diagram shows how central collectors are located over dust-receiving bins, which in turn feed to railroad cars.

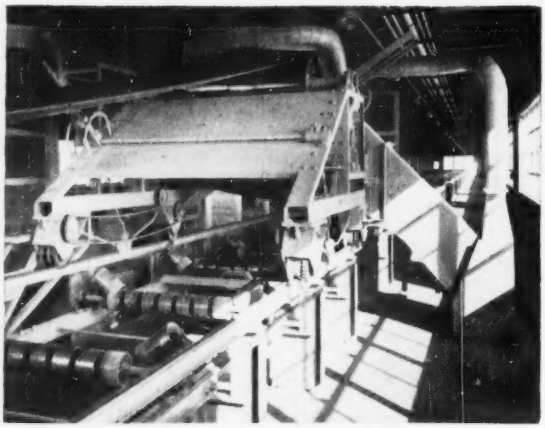
Incoming grain enters the facility by means of a shed-enclosed Link-Belt car dump which can completely unload a 50-ft. boxcar in 5 to 8 min. From the dump receiving hopper, the grain is elevated to the top of the headhouse at 25,000 bu. per hr. and passes by gravity via Fairbanks-Morse scales through Scalperators (squirrel-cage screen's which scalp and aspirate the grain). Then a belt distribution system delivers the grain over the bins at seventh-floor level.

Below the elevator heads, receiving

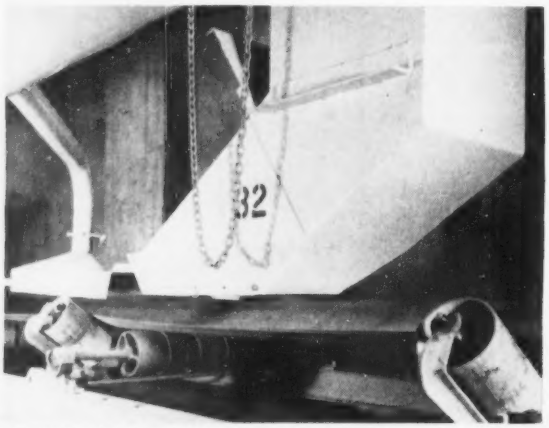
Whisk Dust Away Wherever It Occurs



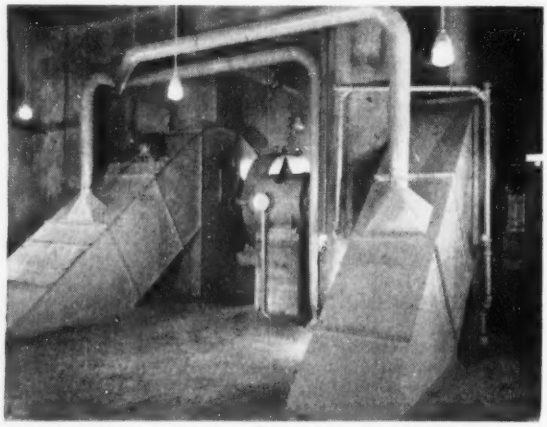
INITIAL CONTROL of dust is at car-dump, where filter station (upper right) returns airborne dust to incoming batch. Note suction grille beneath car tilter.



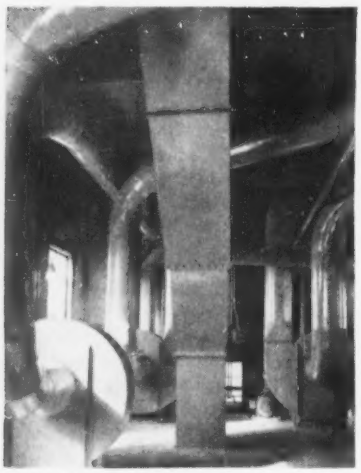
DISTRIBUTING grain to bins, tripper is fitted with suction hoods above belt and bin manhole. Hook-up is to main suction header (upper left) via sliding gates.



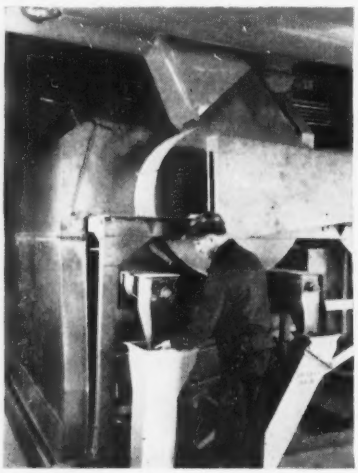
DISCHARGING GRAIN from bins is protected by suction hood (adjacent to chute on belt, left). All spouts in over 400 ft. of moving belt are similarly equipped.



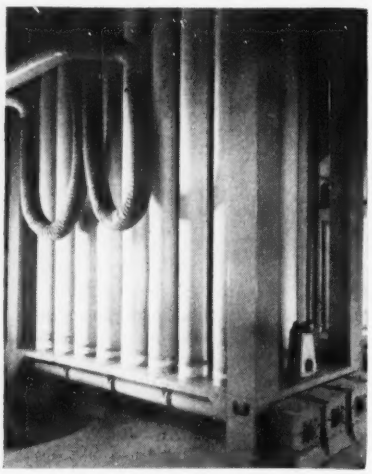
ATOP headhouse, chutes from elevator legs have suction connections. Floorsweeps and vacuum cleaning connections (pipe right of column) are on all floors.



INDIVIDUAL fans on four huge Scalperators have been replaced by large suction ducts (as seen here, center) leading to central fan and two dust collecting units.



CLEANING unit has direct duct connection (top center) into dust control system. Spout (left) discharges chaff through screw conveyor into closed collecting bin.



CLOTH-TUBE filters in special dust house. Traveling rings jet air through tube, cause dust to fall to choke-box at bottom. Screw conveyor removes accumulation to bins below.

garners, and scales occupying the top four floors of the headhouse, is a complete, gravity-fed grain cleaning and grading system. It consists of 4 of the Hart-Carter Scalperators on floor nine; distributor spouting on eight; 2 Eureka cleaners on six; 2 Superior separtors on the fifth floor. On the floors below are 19 Howe graders gravitating into receiving bins on the first floor.

In the basement of the building is a belt distributing system that routes out below the bin bottoms for turning and movement to shipping. A shed-enclosed track dock on the opposite side of the headhouse from receiving provides for loading of boxcars.

Integrated Dust House

An ideal dust collection system is one which has a balanced static condition throughout its collecting ducts —duct runs are relatively equal in resistance and none are prohibitively long. This was achieved by grouping filters and collecting bins in a specially designed dust house integrated completely with the cleaning, grading, and distributing process.

This dust house is a six-story bay jutting from the north side of the headhouse and overlying the enclosed shipping dock. Its top two levels contain a battery of cloth-tube filters, and the floors below locate three circular steel dust-collecting bins that are fed by screw conveyor from each collector.

Dust collection is completely by parallel-flow cloth filters. Most of the filters consist of 32 tubes, served by a reciprocating manifold of air-jetting rings that dislodge the dust particles from the inside of each cloth tube. All are Day type ("AC") units employing the patented Hersey methods of cleaning. Parts for these filters are all interchangeable.

Collecting points are wherever dust might be raised throughout the plant. Thus suction hoods are present at both the car dumper and loader, all belt loading and transfer points, movable trippers, scale turnheads, and on the actual processing equipment. In the latter case, actual revisions were made in the machinery to permit direct connection into the Day system.

While this network of collecting ducts seems lavishly complete, the actual amount of air required is surprisingly low—approximately 140,000 cfm. for the whole system of eight filters. Consider that as much as 25,000 bu. can be handled by the facility in 1 hr. Then by calculation it can be seen that only a little over 1 lb. of air is required to control dust for every pound of grain handled.*

Responsible for this fine efficiency is the "static balance" previously mentioned, permitting exact fan sizing to maximum plant operation.

Complete Coverage

To get an idea of the lengths to which the company went to achieve complete dust control, let us spot grain movement at various stages in the elevator:

At the car dump, the boxcar is tilted 40 deg. to empty through a metal grate into a hopper below the receiving platform. Two suction hoods placed over this hopper, with grates parallel to the tilted car, remove attendant dust to an adjacent filter. Here, the choke boxes on the filter empty directly into the receiving pit because of the Grain Exchange requirement that all incoming product must be weighed.

Next the grain is moved into the various elevators for delivery to the top of the headhouse. Each elevator leg has a suction connection on its boot and also at its top.

After automatic weighing—the scale turnhead is protected by suction—the grain passes through Scalperators and is spouted to two long distributing conveyor belts that serve the storage bins. Transfer of grain from spout to belt is covered by suction hooding.

A unique Day suction attachment is part of the moving tripper that delivers the grain into various bins. A suction header equipped with slide gates runs above the distributing belt, and this is quickly hooked into when the tripper is set up over a bin.

When grain is discharged from the bin for turning or conditioning prior to use, each chute outlet onto the belt is protected with a hood and suction piping that collects into a main duct served by a filter in the dust house. These hoods thus run at intervals for over 400 ft. under the bins.

Grain from the bin is elevated to the ninth floor of the headhouse to pass through a Scalperator for initial rescalping. Here the individual fans were removed and the machines connected directly into suction piping. In this case both the fan and two required filters serving the operation are located in the adjacent floor area. Collected chaff, however, spouts below to the collecting bins.

Three floors below, the grain is spouted to Eureka cleaners. Like the Scalperators, these units also have had their exhaust fans removed and are piped directly into the suction system leading to two filters on the sixth floor of the dust house.

Next the grain passes through Superior separators served by a single filter. On this floor there is also a grain trap that removes heavy particles from the fine dust. This is simply a large chamber, in series with the suction line, which causes the "heavies" to settle out due to the drag in air velocity.

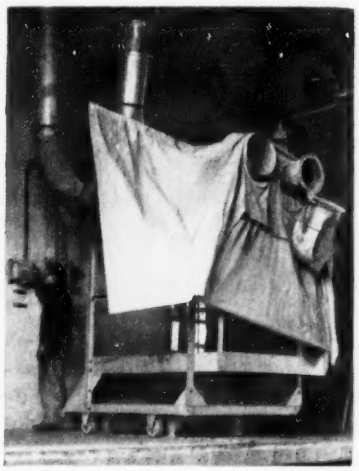
Final operation is grading. The clean and dust-free grain is dropped into first-floor bins, which divide it into four sizes. Schlitz finds this size grading very important as regards subsequent steeping time in malting.

Boxcars are loaded with grain by gravity, and a canvas hood over the car door permits suction to remove all air and dust from the car. The duct from this hood leads to a filter

(*Turn to page 182*)

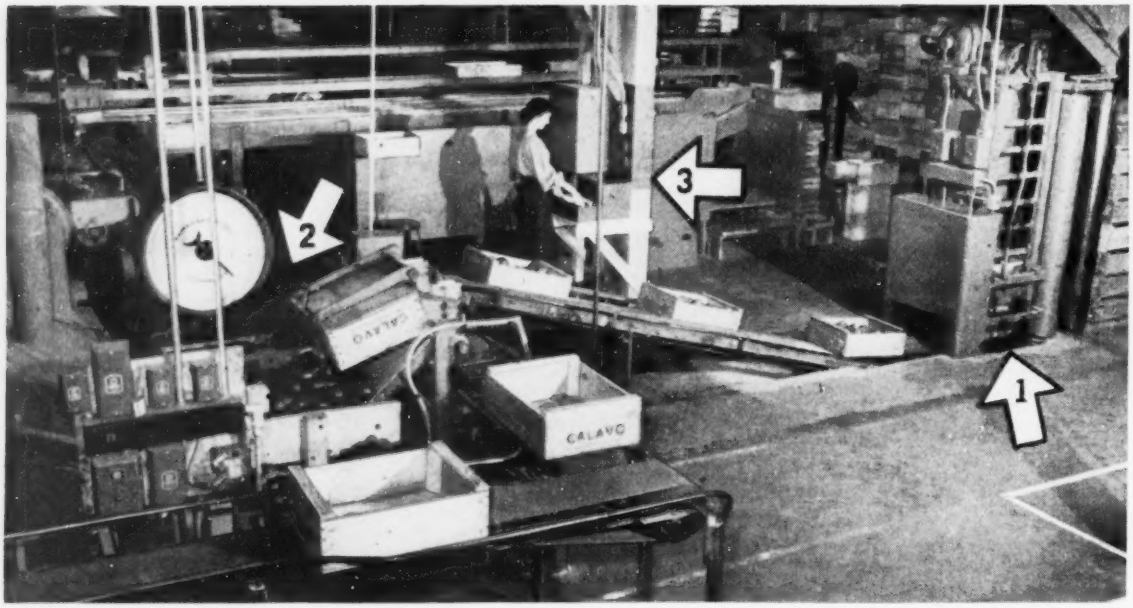
*Air weighs about 80 lb. per 1,000 cu. ft. at sea level; grain weighs approx. 100 lb. per 2.5 bu.

DUST collecting bins, 14 ft. high, are fed directly by spouting from dust collecting system above. Collected material is pneumatically loaded into boxcars and sold for feed.



SPOUTING to boxcars for air-loading collected chaff is protected by cloth hood that fits over car door. Suction is applied separately to cars to remove dust by pipe (left).

Automatic Handling System Dumps Calavos,



COMING IN on conveyor chain, stack of lug boxes (extreme right) is automatically unstacked (1); next, boxes move up and are dumped (2), then weight of fruit in lot is recorded (3). Electrically operated and electronically controlled, system needs but one worker. Formerly, five were required.

Robots Lug-Box Handling

New electronically keyed system quickly, precisely weighs and records incoming lots according to grower, with the old box-tare figuring—and its inherent inaccuracies—"out." . . . Single worker replaces five

C. R. HAVIGHORST
Senior Associate Editor, "Food Engineering"

An electronic net-weight totalizer is the heart of the electrically operated, single-operator materials handling line in operation at Calavo Growers of California, Los Angeles.

The line automatically unstacks lug boxes, dumps and weighs fresh calavos —California avocados—in one-box units, prints the total net weights for each grower's lot, the number of the lot, and the number of boxes.

Capacity of the line is 600 boxes an hour—approximately 12 tons of fruit. Formerly, five men were required on the line. Now, the major part of the one operator's duties is to insert the tally sheet in the automatic printer when a lot has been run.

► **This automated line could be profitably adapted in any food plant where raw material is received in lug boxes.**

It provides an accurate and rapid means of weighing receipts of raw material—a matter comparable in importance to product recovery and the correct fill of finished product into containers. And by weighing only the net contents of lug boxes it eliminates the need to estimate or "average" box tare which, during a season, can vary considerably.*

With the exception of the continuous weighing and electronic unit, this materials handling line was already in operation at Calavo. It was designed by company engineers, who also devised and fabricated the new type box-unstacker.

Stacks of eight boxes are trucked to the floor chain-conveyor which feeds the box unstacker. After a press of the starting button, the fully-automatic line keeps boxes moving in a continuous flow to the scale. It stops only when the weighing of each separate grower's lot is completed.

Then the operator inserts the grower's tally sheet in the automatic printer, and the net weight of the fruit is recorded, whereupon the line immediately resumes operation.

Electronics the Answer

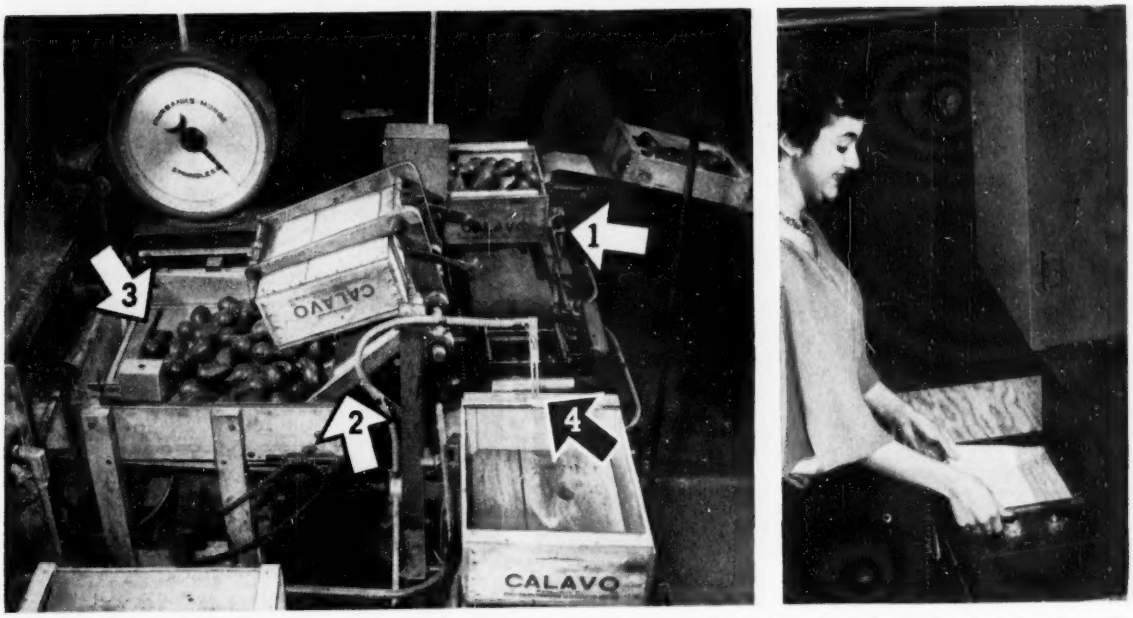
The limiting control, which stops the line when a grower's lot has been weighed, is a metal strip nailed temporarily to the after-cleat of the last box. Growers' lots are carefully arranged by the receiving department in stacks of eight or less boxes.

The top box in the last stack has the metal strip fixed to it. This strip strikes a set of "feeler" contacts immediately after it leaves the dumper. The contact closes a relay in the ETS-7—the electronic weighing unit (manufactured by Industrial Electronic Engineers, North Hollywood, Calif.) that stops the materials handling system, prevents further weighing readings, and indicates end of the lot by lighting an amber light on the printer unit.

Reset of the unit is accomplished manually with a short handle at the right of the printer. When the reg-

* A specific study showed that new boxes used for tomato harvest weighed 148.0 oz. at the start of the season, but scaled an average of 4.8 percent more (155.2 oz.) by the season's end. And new boxes employed in a combined tomato and olive harvest were found to weigh an average of 59.0 percent more (236.0 oz.) at the end of the season (*Food Industries*, July 1949, p. 72).

Scales Them, and Records Accurate Weights



DETAILS revealed. Full box (1) awaits turn to move to dumping unit (2), where fruit is gently chuted onto scale conveyor (3). Feeler-contact (4) strikes metal strip on last box of lot, stopping system. Photo right: Operator now inserts grower's tally-sheet in printer to record lot weight. Then system re-starts on next lot.

isters are reset, the conveyor system starts again and a reading is taken of the weight of the first box in the next lot.

The technique used in automatically reading the scale and feeding the weight readings to the accumulators is much the same as that employed in automatic telephone dialing systems. The weight reading is converted to a d.c. voltage within the scale. Telephone type rotary switches in a resistance bridge circuit find a voltage which equals that from the scale. The position of the wipers of these switches indicates the weight reading in a digit form capable of being entered on the accumulator registers.

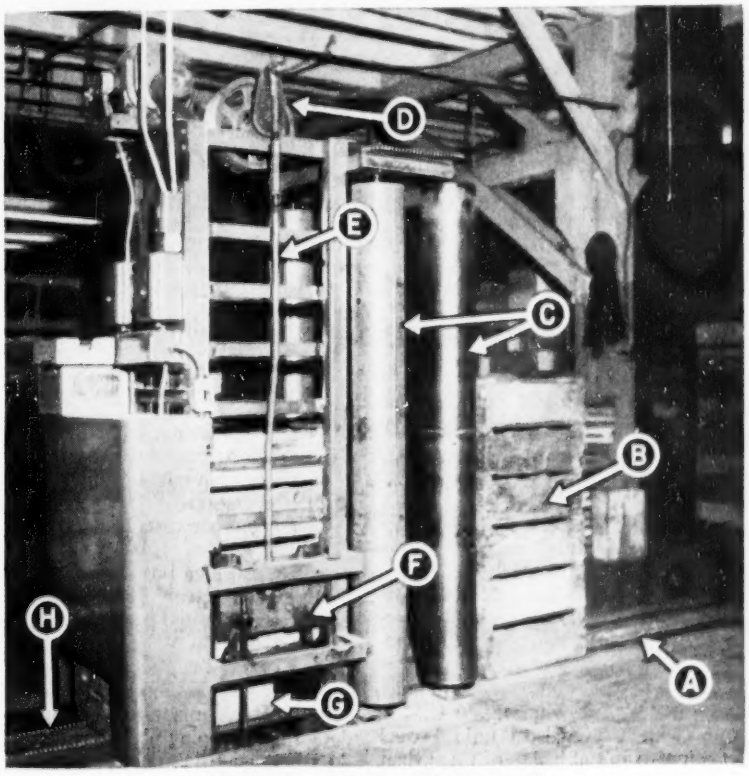
Through use of telephone-type components and techniques reliable operation of the unit is assured.

Advantage of this "mechanical mind"—the ETS-7—lies in its great accuracy (±.1 percent of full scale), its ability to totalize and give *net* weight figures, and its speed (about 1 sec. per entry after scale is balanced).

These factors eliminate human errors often found in weighing operations and, in most cases, eliminate the need for manual operations.

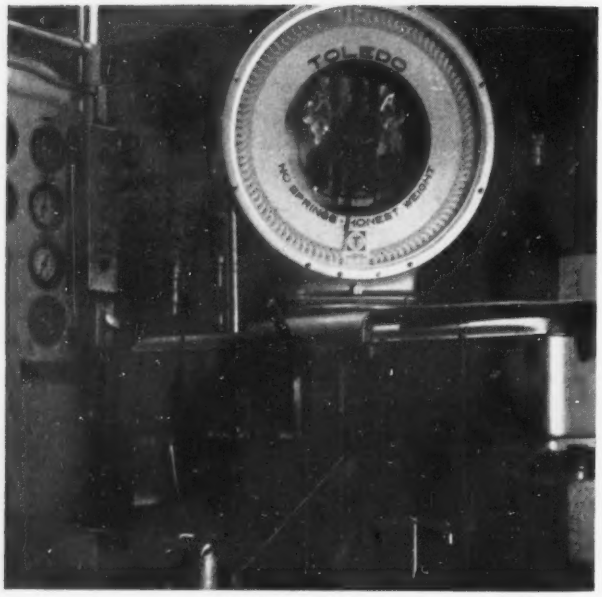
The ETS-7 is extremely flexible in its applications, and its makers project its use in feed mills, chemical plants, and a diversity of other fields, for automatic batching and inventory control.

(*Turn to page 250*)



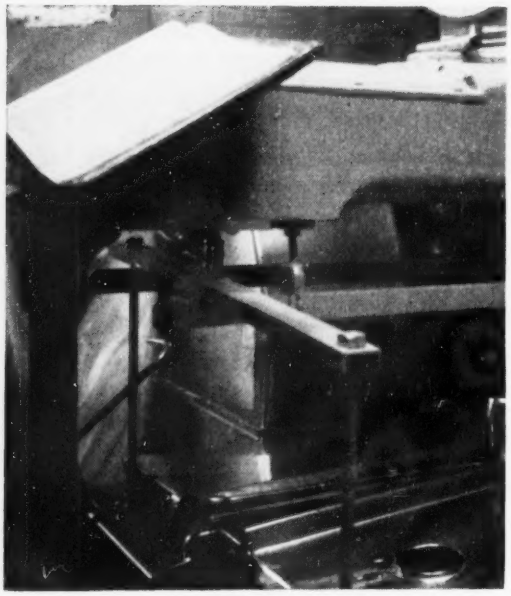
Unstacker "Deals Off Bottom"

"How" of box feeding unit: Conveyor (A) moves stack of "fulls" (B) through positioning rolls (C) into unstacker. Then eccentric (D) with rod (E) lifts carriage (F), raising all boxes except bottom one (G)—seen moving out to dumping unit on conveyor (H). Turn of eccentric now lowers remaining boxes to repeat operation. And as last box leaves, new stack comes in.



Right vs.—

SAMPLING of milk is greatly speeded when weigh can is most easily accessible to the operator—and not . . .



Wrong

. . . **OBSTRUCTED** by tank supports (as above) or otherwise hobbled by poor arrangements of units.

Up Receiving-Room Efficiency

"Engineered" Procedures Do It

Right size crew and equipment . . . suitable placement and speed of units . . . simpler can-handling—all augment performance. Path is pointed in penetrating working study covering large number of dairies

CARL V. HALL

Department of Agricultural Engineering, Michigan State College, East Lansing

Rate of dumping cans of milk is the controlling factor in a dairy plant receiving room operation.

It is influenced by the number of cans per producer, the dumping procedure used, and the adequacy of receiving room equipment.

To attain maximum rate, cans must be available to the dumper. A trucker cannot be expected to unload cans and loosen lids at a rate of more than 7 per min. For a more rapid operation, truckers must help each other. Or a larger receiving room crew must be used.

These are findings resulting from research at the Department of Agricultural Engineering, Michigan State College, objectives of which were:

1. To develop relationships for cost of each operation.
2. To compare costs of using different equipment.
3. To consider possibilities of improving equipment to conform to plant operations and workers.
4. To develop time standards for various operations.
5. To develop checklists enabling equipment manufacturers to improve design, and helping plant operators to do a better job in selecting and using equipment.

Results will be discussed here in relation to operations involved.

In the one-man receiving operation a single worker dumps the cans, weighs and records the weight, takes the sample, and releases the milk from the weigh can.

Two different arrangements were used in the two-man receiving room study. In one, a worker dumped cans, weighed and recorded weights, and released milk from weigh can, while the other one sampled the milk from the weigh can. In the other arrangement, one man dumped the milk while the other weighed, recorded the weight, took the sample, and released the milk from the weigh can.

Two different arrangements were used in the three-man receiving rooms studied. In the first, one man dumped, one weighed, recorded and released the milk from the weigh can, while the third sampled. In the other, one man loosened lids, one dumped, and one weighed, sampled and released milk from weigh can.

The two- or three-man operation can only be justified if subsequent processing operations are slowed down or stopped because of the inadequacy of a one-man operation.

Average of several hundred readings in various dairies gave the basis for the standard times for receiving room operations (see Table I).

TABLE I—TIME REQUIRED for Receiving Milk Varies With Size of Crew

(Unless otherwise specified, dumper checks milk for quality)

	Time, Minutes
A. One-man operation	
Dumping time per can	0.10
Weighing, recording weight, emptying weight can	0.13
Sampling time	0.07
B. Two-man operation	
1. One man dumping; one man weighing and sampling	
dumping time per can	0.091
delay time for weighing and sampling between producer lots	0.06
2. One man dumping and weighing; one man sampling	
dumping time per can	0.10
weighing time for dumper	0.13
C. Three-man operation	
1. One man dumping; one man weighing; one man sampling	
dumping time per can	0.091
delay time for draining weigh can between producer lots	0.02 to 0.06
2. One man loosening lids and checking for quality; one man weighing; one man sampling	
dumping time per can	0.091
delay time for weighing and sampling between producer lots	0.06

TABLE II—DUMPING RATES Obtainable With Different Sizes of Can Washers

(Manual dumping, five cans per producer)

Washer Size Cpm.	One-Man Operation	Two-Man Operation	Three-Man Operation
6	5.5*	5.6	5.8
8	6.1	7.3	7.7
10	7.1	8.9	9.5
12	7.1	9.7	10.3
14	7.1	9.7	10.3

* Calculated value is 5.0 cpm. However, an operator was able to obtain 5.5 cpm. by moving a can into washer with extra movement of his arm between time of sampling and recording weight.

TABLE III—OVERALL Labor Efficiency of Receiving Room

(Manual weighing and recording)

Number Workers	Actual Performance, Man-Min. 100 Cans	Cans Per Minute Obtained	Size of Can Washer, Cpm.	Goal for 5 Can Producers, Man-Min. 100 Cans	Workers' Tasks *	Major Causes For Delays
1	17.9	5.6	10	14.1	A	a
1	16.6	6.0	12	14.1	A	b
1	21.8	4.6	8	14.1	A	c
1	18.2	5.5	6	14.1	A	d
2	30.4	6.6	7	20.6	B–1	e
2	35.0	5.7	13	20.6	B–2	f
3	34.2	8.8	14	30.0	C–2	g
3	31.2	9.6	13	30.0	C–1	h

a. Low-capacity clarifier, cans not supplied to dumper rapidly enough, can washer lid discharge not functioning properly.
b. Lid feed not functioning properly, cans pinched while dumping.
c. Vacuum sampler used inefficiently.
d. Can washer too small.
e. Cans supplied to dumper too slowly, can washer too slow.
f. Same person dumping and weighing (sampler should weigh).
g. Cans supplied to dumper too slowly for multiple-man receiving room, man loosening lids not fully occupied.
h. Cans supplied to dumper too slowly.

* In this column, letters and numbers refer to workers' tasks detailed in Table I.

Time for weighing and recording may be decreased from 0.13 to 0.095 min. by using a print-weigh device on the scales. At 1952 prices, with labor at $1.75 per hour, approximately 4.8 yr. would be required for a 40,000-lb.-per-day dairy to pay for the added cost of this device. Possibilities of decreasing weighing errors and the ease to the weigher should be considered, however, in addition to the time saving, when purchasing such a device.

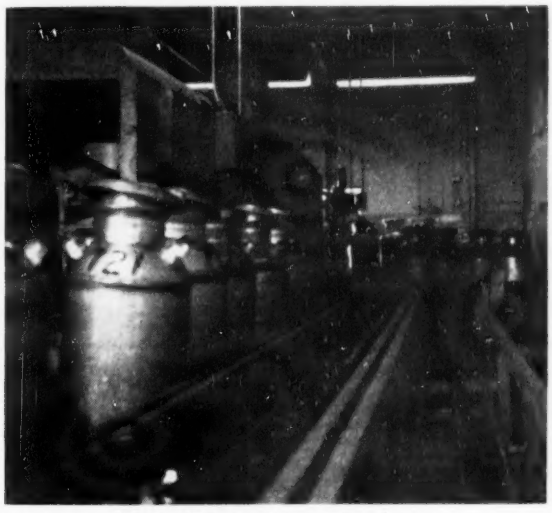
In a three-man receiving operation, where a worker is inside the plant loosening lids and checking odors (as outlined in C-2, Table I), this inside worker's productiveness would be increased if he were placed outside the room to set cans on conveyor, loosen lids, and check for odors.

The dumping procedure has much to do with the rate of emptying the cans, recording weights, and sampling, particularly for a one-man operation. Important are the factors of ease of carrying on the work and preventing milk loss by providing adequate time for drip.

There was no correlation between rate of dumping and amount of milk

Good—Pinching Abolished

CANS are dumped at right angle to incoming conveyor, thus eliminating pinching from filled cans.



Bad—Empty Line Too Long

LONG empty-can conveyors mean small truckers must wait for empties. This frequently upsets schedules.

in the cans. There was an average of 60 lb. of milk in a can, except during the spring months when the weight was 72 lb. This data would apply to dairies in southern and central Michigan, where the average producer ships about four cans of milk.

If the arrangements are such that the trucker does not loosen lids, the dumper should loosen a series around the conveyor, dump the cans, and repeat, rather than loosen the lids individually as the cans come to the dump rail. Time required to loosen only one lid is 0.07 min., whereas the average time required to loosen each lid while walking around the conveyor is 0.02 min.

Weigh and Receiving Tanks

Weigh cans are normally manufactured in 500, 750, and 1,000-lb. sizes. Similarly, they are usually mounted on 500, 750, or 1,000-lb. scales. The 750 or 1,000-lb. scales may be used for the 500 or 750-lb. weigh cans, however.

The question frequently arises as to how large a weigh can should be. Size should be determined by the amount of milk handled daily and number of large producers. If all producers shipped less than 500 lb., there would be no advantage in using a weigh can larger than that. As the percent of producers over 500 lb. increases, and as the number of pounds of milk handled daily becomes greater, the value of labor saved through dumping increases with the larger weigh can.

In the one-man receiving room there is sufficient time for the weigh can to drain while the worker records weight of milk. In the two and three-man operations speed of dumping is controlled by time required to drain the weight can. It is necessary for the person doing the weighing to observe the milk draining from the weigh can or to watch the hand on the scales before closing the valve after each weighing.

In all the plants studied, milk was released from the weigh can through a valve controlled by a manual- or air-operated hand lever. The lever was again manipulated to close the valve.

(Turn to page 184)

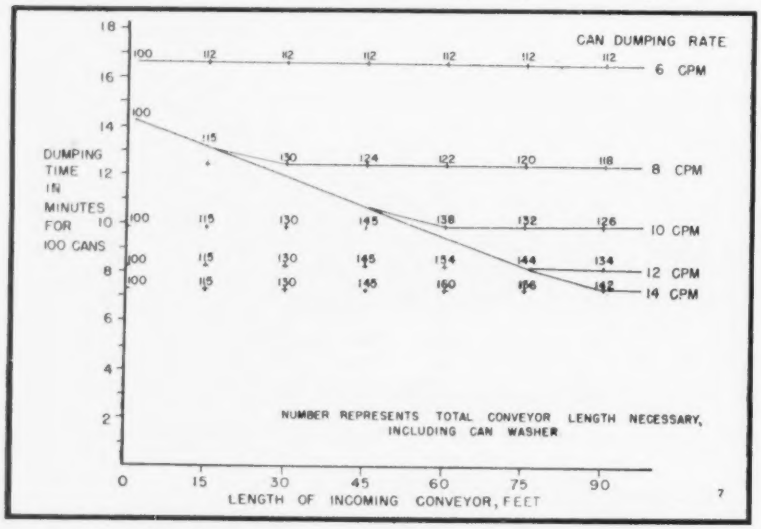


FIG. 1 CAN DUMPING TIMES are associated with total length of conveyor system and that of the incoming section.

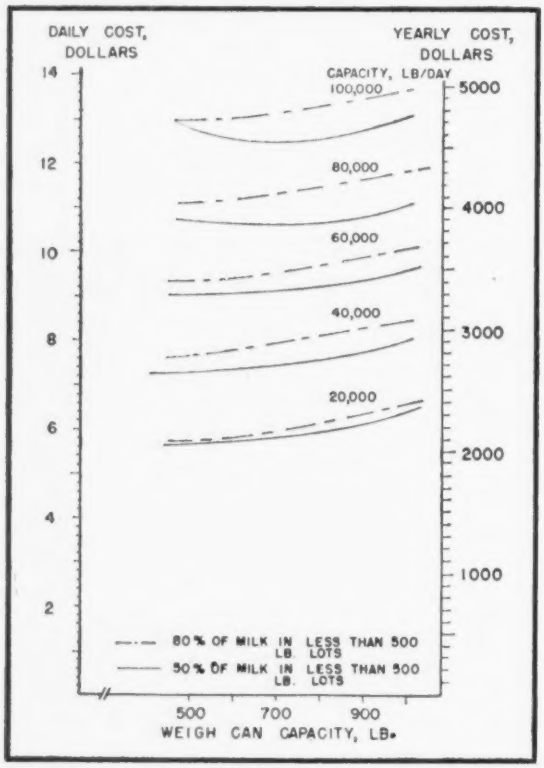


FIG. 2 WEIGH-TANK CAPACITY is governed by number of producers, and quantity each produces.

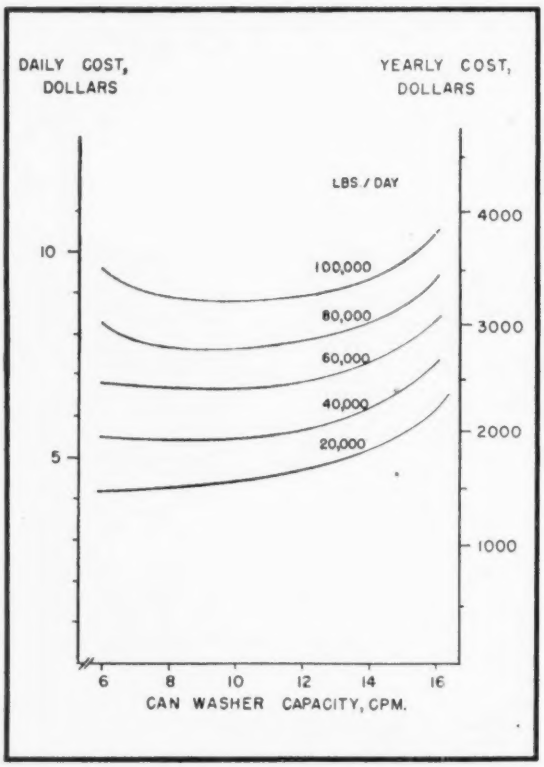
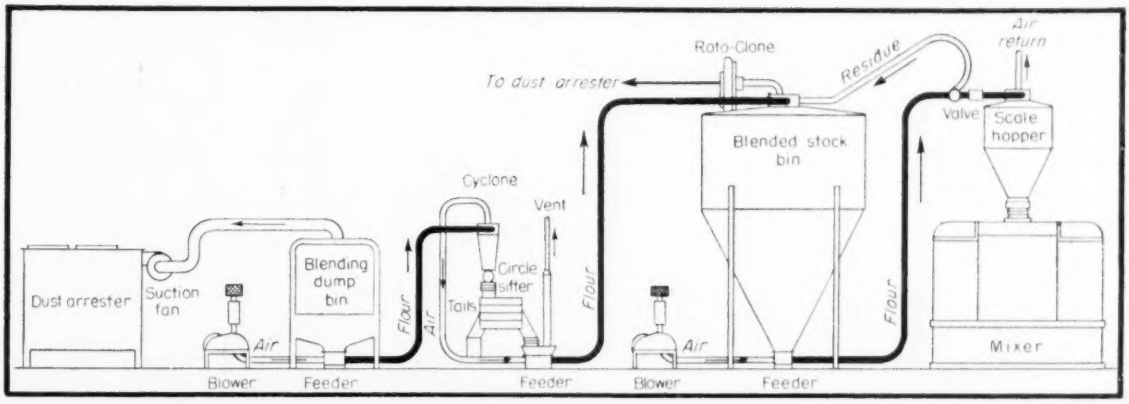
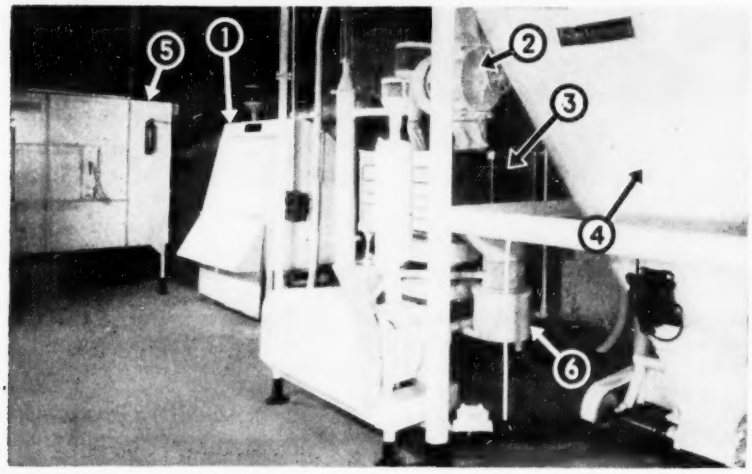
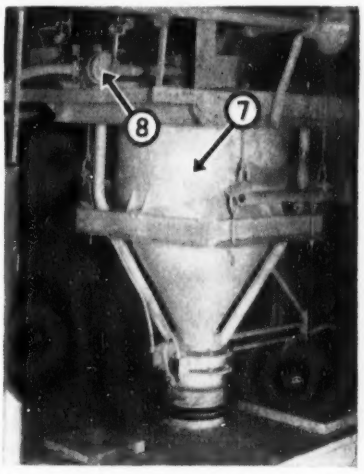


FIG. 3 OPERATING COST of straight-away can washer depends on size of unit and total milk receipts.



EFFICIENT NEW SYSTEM designed to handle flour pneumatically in comparatively small bakeries.





FLOUR IS AIR-TRANSPORTED from sack to mixer—simply, yet with high performance—by this effective equipment. The bagged flour is poured into blending dump—(1) in photo at left—then is carried pneumatically to small cyclone and airlock (2) located just above Circle sifter (3). After sifting, flour is delivered to storage bin (4). Above this bin is a Roto-Clone centrifugal separator that creates suction for dust circuit and returns all but extreme fines to bin. Fines eluding this unit are conveyed to a dust arrester (5). Foreign matter eliminated from flour by sifter is deposited in container (6) for periodic removal. From bin, flour is airborne to scale hopper—(7) in photo right. A remotely controlled line valve (8) returns flour in transit to storage bin to avoid over-run.

From Bags to Process by Air

Designed to smaller scale, pneumatic conveying system offers high handling efficiency to plants buying ingredients in bags

E. T. SLACKFORD

Processing Machinery Department, Allis-Chalmers Mfg. Co., Milwaukee

In recent years, much thought and study have been given to the possibilities of air transport of dry ingredients in the comparatively small food plant.

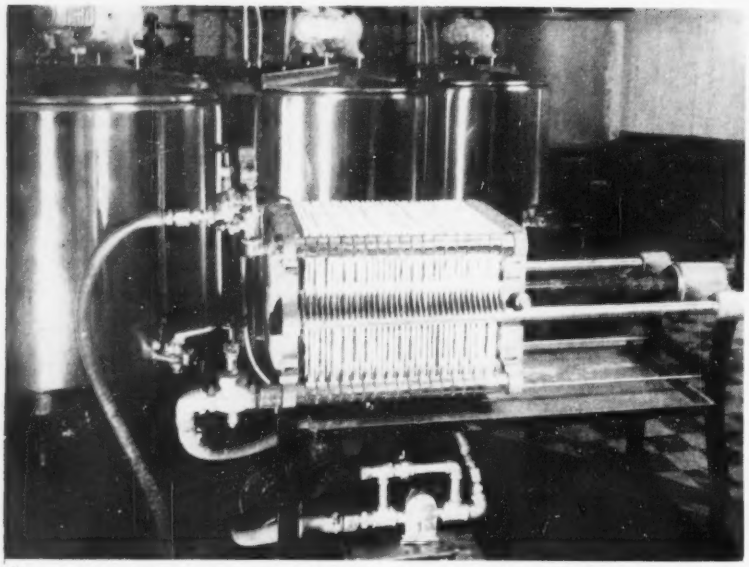
Flour handling in the typical bakery, for example, has spurred developmental work along such lines. Many bakeries have found that they cannot keep up with today's demands with equipment and methods outdated by today's standards.

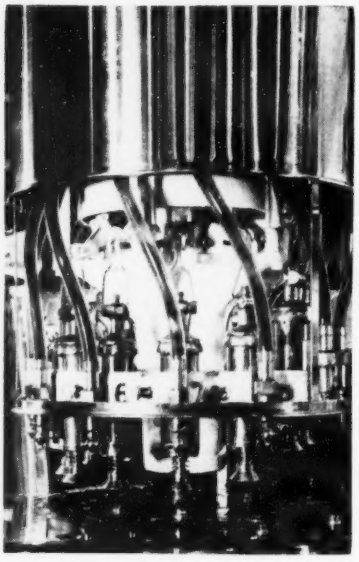
Pneumatic conveying is seen as one solution to this situation—for it not only is quite efficient but also provides a very high degree of sanitation in materials handling. And because of this latter virtue, pneumatics are also looked upon with increasing favor by FDA inspectors.

To provide an economic and workable pneumatic conveying for the smaller plant—and particularly bakeries—the Fuller Co. recently unveiled a new in-plant system in its experimental plant at Catasauqua, Pa. This system (detailed above in flow-sheet and pictures) has since been placed in operation in a number of baking plants with consistent success.

Essentially, the new system permits continued receiving

(Turn to Page 233)





DUE to its function, syrup room (left) is extremely vulnerable to micro-biological invaders. Then passage of the bacteria- and yeast-laden product to the syruper (right) completes the beverage contamination cycle.

Here's How to Nip Those

Beverage Contaminators

Quality killers get in via improper storage of materials, use of untreated water for rinsing, lack of personal cleanliness among employees . . . But this "divide and conquer" attack will keep them out

NINO F. INSALATA
Associate Technologist, General Foods Corp., Hoboken, N. J. Formerly, Chief Bacteriologist, White Rock Corp., Brooklyn

If you are going to produce sterile, top-quality beverages, you must track down and curb all sources of infection and contamination in the plant.

These sources are numerous—extending from raw material storage facilities all the way through to the bottle-crowning station.

Hence, to line up the most practical assault on invading organisms, we will discuss each of the foci separately, in every case rounding out with specific methods for overcoming the contamination in question.

Raw Materials

1. Liquid sugar: While initial numbers of bacteria or yeast in liquid sugar are comparatively small, special storage precautions should be taken to avoid the circumstances which cause them to increase and produce decomposition by fermentation.

Measures should be taken to assure proper circulation of the air in the upper portion of the storage tank. If this is not done, moisture will condense and dilute the upper layers of the product, thereby rendering it more susceptible to yeast spoilage. When tanks are not equipped for ventilation, a hole (approximately 4 in. dia.) may be cut in the upper portion, and a fan inserted in such a manner as to circulate the air. A filter should be placed at the air inlet to prevent entrance of foreign matter.

To insure protection against microorganisms present in the atmosphere, an ultraviolet lamp should be installed in the tank at the level at which the air enters. In this manner, filtered, purified air circulates in the top of the tank and prevents condensation and, therefore, spoilage.

Other factors of concern are the manner in which the sugar is pumped over into the flavor tank. All hoses and valves should be cleaned and sterilized before use. Periodic tests for bacteria and yeast should be made, and there should be regular cleaning and sterilizing of the interior of the tank by use of live steam or chlorine solution (10-15 ppm).

2. Bagged sugar: While in the dry state and less subject to immediate spoilage, bagged sugar may harbor mold spores that are extremely resistant to heat and other unfavorable environmental conditions. Storage of the product is very important inasmuch as dirt, dust, and even rodent excreta, may be deposited on the bags. And unless extreme caution is taken bacteria, yeast and molds may find their way into the sugar solution.

It is dangerous to believe that either the hot batch process or flash pasteurization will be a cure-all, for there are strains of bacteria and yeast which are resistant to the temperatures employed. It is far safer to think of sterility as a general plant function than to rely too heavily on any one phase to control all infections.

Because many states have their own legislation concerning storage of food products such as sugar, it is suggested that the individual bottler consult his local health authority. Regardless of state regulations these rules should be observed:

a. Bagged sugar should be stocked on pallets, off the floor.

b. Space should be allowed between piles or rows of bags.

c. Dark, damp, musty places should be avoided.

d. Caution should be exerted to control roaches, rats, and other pests.

e. Stock should be rotated to prevent use of newer sugar and backstocking of old.

f. Dirt, dust, and other offensive characteristics should be removed from bags before they enter the syrup room or are opened.

Raw, Untreated Water

There are bottlers today who do not employ any form of water treating equipment whatsoever. They feel that their raw water is good and does not require chlorination or other sterilizing treatments. It is hard to understand why they do not realize that such waters are chronic sources of bacteria, yeast, mold, and algae, all of which may be found living freely in raw waters.

Use of a sand and carbon bed, coupled with a paper and/or cloth filter, is not an adequate treatment. Such setups are capable of removing suspended particles and unwholesome gas odors, but they do not in any way take out those organisms responsible for the offenses.

Bottlers operating without water treating equipment should give serious thought to the many types of apparatus that are commercially available. Before making an investment, however, the following important question should be asked: "Is the water well balanced chemically?"

This can only be determined by an analysis. And if the water is found to require balancing, softening, or an increase or reduction in total dissolved solids, then a continuous flocculation system is desirable. This will not only destroy foreign organisms by chlorination but will also balance the chemical aspects of the water.

In those cases where water does not require chemical balancing, the problem is one of sterilization by destroying organisms and removing them by filtering. Chlorine dioxide is satisfactory here, for it has an oxidation rate 2.5 times that of chlorine. This high rate of oxidation will readily destroy the organism if given the proper retention time of ½-2 hr.

Diatomaceous earth filters used in this system are based on stainless steel coils that have perforations which will screen out all particles larger than 0.1 micron.

When a water treating system is installed, it is imperative that provisions be made to supply chlorinated water to the final rinse compartment of the soaker. A solution of 8-10 ppm. chlorine, injected into the bottles while they are in the inverted position, will sterilize the interiors rather than recontaminate them, as is possible with raw, untreated water. Contrary to the opinion of some bottlers, injection of this strength solution will not affect the color, taste, or odor of the finished product.

Treating-Equipment

While the function of water treating equipment is to remove foreign organisms, specific areas of the system may become infected and act as foci of recontamination. This is particularly true where only sand and carbon beds are used, with or without the benefit of paper and/or cloth polishers. The particular organism of infection is algae, an aquatic plant that lives freely in almost all waters.

Flocculation tanks that are not properly chlorinated and retention tanks fed from them are also possible foci of infection. Once bacteria, yeast, or algae have entered a system that is not functioning properly, they are capable of entrenching themselves firmly and reproducing at a tremendous rate.

Sterilization of sand beds can be accomplished by backwashing with a 25 ppm. chlorine solution. It should be introduced into the bottom of the bed and allowed to pass up through the unit until the effluent shows a Cl content of 25 ppm., as determined by a Taylor chlorometer. Process should then be reversed by adding a 25 ppm. solution to the top of the bed and allowing it to remain for at least ½ hr.

The same procedure is followed in sterilizing carbon beds. However, a great deal of the Cl will be dissipated by the carbon. For this reason, a 50 ppm. solution should be used. This excess of Cl will not harm the carbon in the bed, since it is absorbed on the surface of the particles and quickly washed away when the unit is backwashed.

Another good method of sterilizing carbon beds is to introduce steam at 12 psi. pressure for at least 1 hr. Then the drain valve in the bottom of the unit is opened to allow condensate to escape.

Bottling Equipment

Once a treating system has failed to function properly, it allows entrance of organisms into the plant to contaminate the bottling equipment. Filler valves, especially the snifts, are dangerous areas. Syrupers become infected by contaminated water coming down from the syrup room during wash-outs. Coolers and carbonators are also subject to algae, bacteria, and yeast. And filters become breeding places for recontaminating the product.

Such difficulties may be overcome by use of hot water (160 deg. F. or higher) and a good detergent. Cleaning solution may be placed in the cooler basin after it has been cleaned, then pumped to the carbonator and through the filling valves. This is followed by a 25 ppm. Cl solution. It is absolutely necessary to use a cleaning solution prior to the Cl, because sugar and/or dirt in the apparatus will oxidize the Cl and render it almost useless as a sterilizing agent.

Syrup Room

The syrup room is one of the most vulnerable areas in the bottling plant. Its function renders it susceptible to all forms of infections, especially bacterial and yeast invaders. Presence of sugar solutions, occurrence of loose valves that drip syrups, and excessive water on the floors are all conditions that give rise to high bacterial counts.

Moreover, use of improperly stored liquid sugar that fosters yeast cells, also careless handling of sugar bags, introduce bacteria and mold into the syrup room. Then improper wash outs, using raw water, or passage of bacteria- or yeast-laden syrup into the syrupers completes the cycle.

Contamination here can be overcome by employing the following measures:

1. Clean all sugar bags before carrying them into the syrup room.
2. Sterilize all tanks, valves, and hoses regularly, using a good cleaning solution and 25 ppm. chlorine.
3. Maintain floors, walls, and ceilings as clean and dry as possible.
4. Avoid excessive traffic and storage of unnecessary materials.
5. Use ultraviolet lights of proper intensity over tanks.
6. Avoid holding-over either simple or finished syrups.
7. Insist on extremely cautious personal habits and working procedures by all syrup room personnel.
8. Wash out all tanks, lines, and syrupers after each run. Then leave Cl solution in lines and syrupers over night. If properly washed, strength of the Cl solution need not exceed 2-3 ppm.

Miscellaneous Foci

There are several areas in a bottling plant that are not immediately thought of as sources of product spoilage due to organisms, but nonetheless are foci affecting the general condition of the bottling area.

Care in storage of crowns is an important factor. Excessive dampness or dust will result in product "wildness" and can produce spoilage if bacteria or yeast are introduced via these faulty crowns.

It is also important, that soaker brushes be kept in clean condition, especially where no water treatment is employed. All forms of organisms and organic debris will lodge in them and infect the bottles.

Location of empty return bottles should be as far from the filling line as possible, for empties often contain small amounts of sugars and syrups which promote bacterial and yeast growth. If these empties are too close to the soaker, currents created by the hot air rising from this unit will pick up the bacteria- and yeast-laden air from the return bottles and contaminate the atmosphere, which in turn will infect the apparatus.

Unusual as it may sound, people are very often the carriers of yeast as well as bacteria. At the 52nd annual convention of the Society of American Bacteriologists it was disclosed from the research of reliable members that in a group of 258 people, 50 percent were found to carry yeast cells.

Of the 129 yeast carriers, more than 60 percent bore the sugar-fermenting type which is responsible for sour spoilage. It is also interesting to note that these persons were not employed in an industry using or making yeast in any manner or form.

Therefore, it is clear that attention should be given to the condition, appearance, and personal habits of those people who work in syrup rooms and in the immediate area of the bottling plant.

Evaporator-Dryer Load-Balance Curve Ups Gelatin Output

FRANKLIN KRAMER and LOUIS GARONO

Respectively, Central Laboratories Div., General Foods Corp., Hoboken, N. J.; and Atlantic Gelatin Div., General Foods Corp., Woburn, Mass., now at Army Medical Center, Maryland

How to increase gelatin output some 33 percent—quickly and with existing equipment . . . That was the problem at our Atlantic Gelatin Div., Woburn, Mass. And the answer was found in more efficient, better balanced operation of evaporators and dryers.

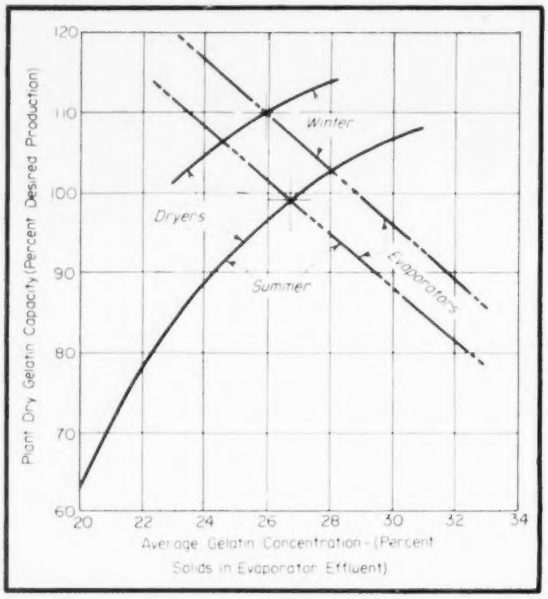
As background for our solution, here briefly is the gelatin process: The major material, insoluble protein called "collagen," is solubilized into gelatin by first treating the stock with various acids and bases and then "cooking" in hot water. After primary filtration, the liquid gelatin is concentrated in vacuum evaporators and chilled in refrigerators to change it to a jelly. The chilled gelatin sheet then is spread on nets and dried in counter-current air tunnels. Finally, dried strips are ground, and ready to use.

Since the gelatin concentration obtained from the "cooking" operation is about 4 percent, some 24 lb. of water must be removed per pound of dried gelatin. It was not surprising, then, that evaporation and drying constituted the main bottleneck in the process.

Our first move was to bring evaporators and dryers to their maximum individual capacities. Steam pressure on the evaporators was increased to the allowable limit. And baffles installed in drying tunnels stop by-passing of air.

But that was only the beginning. Next we had to balance the water-removal load between evaporators and dryers to get maximum combined capacity. More gelatin can be processed in the evaporators when less water has to be evaporated, obviously. But the more moisture removed in evaporation, the less the load on the dryers and the greater their output.

To establish best balance, test runs were made at different evaporator- outlet concentrations, and corresponding capacity curves were plotted for evaporators and dryers (see accompanying chart). Because of case-hardening effects, the dryer capacity curves show a lower rate of



GREATEST OUTPUT of gelatin plant is achieved by balancing dryer and evaporator loads. This is done by operating evaporators at effluent concentration indicated by point where curves cross. Varies from summer to winter.

increase in the high effluent concentration range.

Maximum plant capacity is obtained with the evaporator effluent concentration represented by the point where the evaporator and dryer curves cross.

However, the balance curves vary from summer to winter. Increased outdoor temperature and humidity affect the condenser-cooling-water temperature and therefore the evaporator vacuum. Humidity also affects dryer "pick-up" capacity. Therefore the balance-point concentration is lower in winter than in summer.

The balance point also must be shifted because of mechanical changes and variation in operating methods. If one of the battery of evaporators is out, for example, the balance point will shift toward the evaporators. Then the reduced outlet concentration will give greater evaporator throughput. This will cut dryer capacity slightly, but will allow greater plant production. Type of gelatin and sheet thickness will, of course, affect the balance.

Actual plant operation under these optimum conditions confirmed the predicted plant capacity.

Based upon a paper presented before the New York Section of the Institute of Food Technologists on January 15.

SPECIAL TRUCK-TRAILER TRAIN that is both simplifying and accelerating movement of dry sugar to processors in San Francisco Bay and Los Angeles basin areas. Made of aluminum, tanks tote a net payload of better than 20 tons over 400-mile range. Hydraulic units tilt them for free unloading.

Bulk Granulated Sugar *by Truck*

New efficient carriers specifically modeled to haul capacity loads of free-flowing product. Aerator installation at plant prevents it from lumping

THROUGH development of speedy, economical, and convenient truck-type delivery of bulk granulated sugar, new standards of performance are now being chalked up in the movement of dry sweeteners from refinery to food processors.

By "bulking instead of bagging," the former time-taking and expensive packaging operations have been dispensed with. And accordingly handling requirements have been virtually wiped off the working slate.

Clearing the Hurdles

Like most practice-improving endeavors, however, truck-trailer distribution of bulk granulated sugar faced a number of hurdles before it could be counted a success.

For one thing, means had to be found to condition the sugar against caking. It had to be free-flowing for such deliveries. For another, special vehicle bodies were required for carrying it.

Both of these problems were solved at the Crockett, Calif., plant of the California & Hawaiian Sugar Refining Corp., Ltd.—by the installation at the refinery of special conditioning equipment and through design of a special trailer body.

The $200,000 C&H conditioning equipment (pictured FE Oct. '52 p. 199) consists of a large storage unit (capacity 100 tons of sugar) and two 25-ton scale hoppers in which blowers force filtered air through the sugar to condition it against caking.

TRAILERS are quickly sleeve-loaded at this covered outdoor station, which also includes a spur for supplying rail cars.

This aerating removes traces of moisture clinging to the crystals as they emerge from the refining machines. The aerating installation has a capacity of 400,000 lb., or 200 tons of sugar, every 24 hr.

Moisture-free sugar is loaded into the tank trailers (or special railroad tank cars) at a covered outside loading station (see photo).

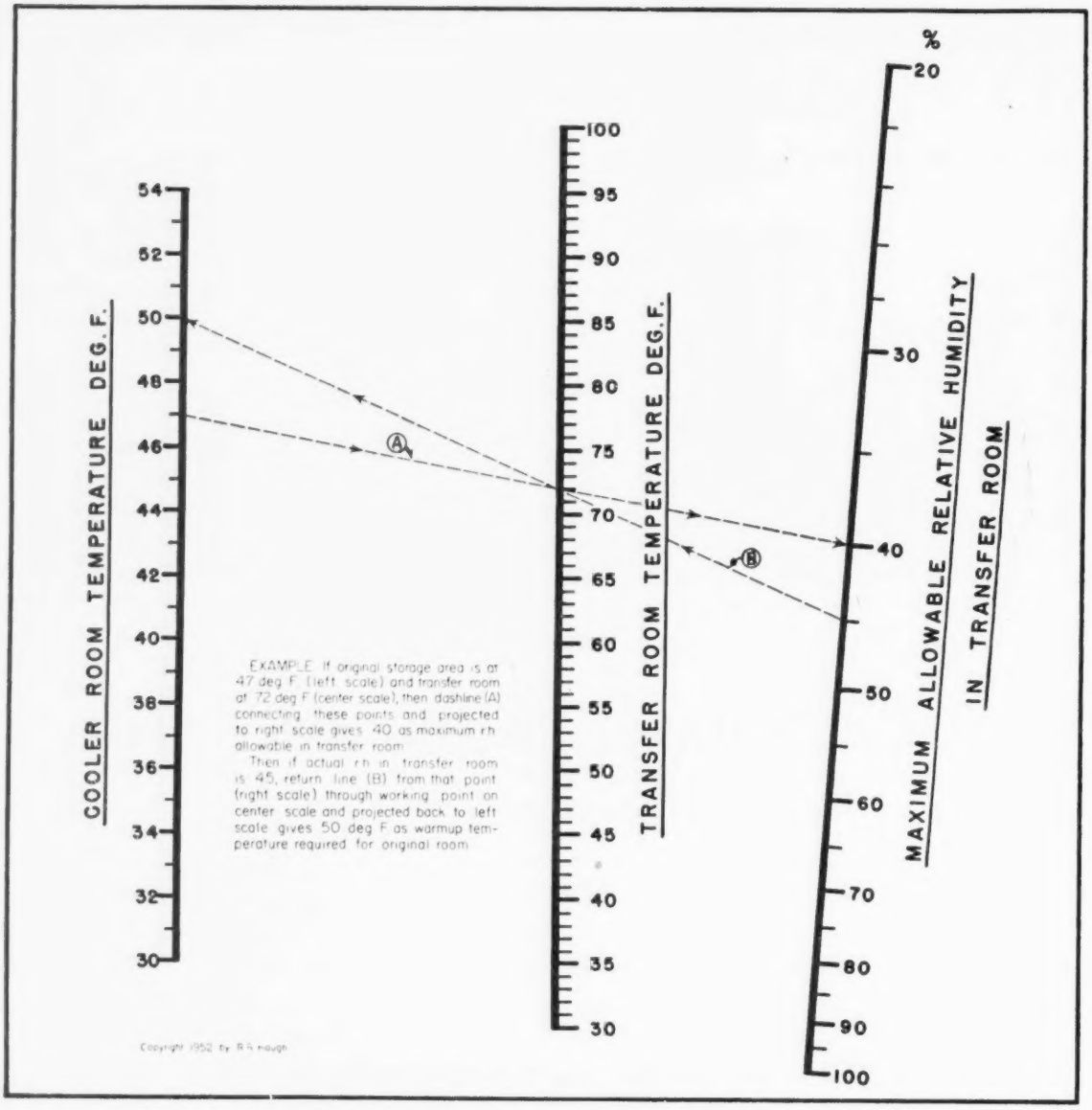
The special motor vehicle tank body, which delivers the sugar from the refinery to the food processing plant, consists of a rectangular tank with a rounded bottom and a truncated pyramid-shaped top. Rounding of the bottom eliminates right-angled corners in which the sugar could collect and accordingly facilitates unloading.

Since sugar when piled forms a cone with 40 deg. sides (natural angle of repose), the sides and ends of the body top are designed at this same angle to fit the shape of the load with minimum exposure of the sugar to the air.

In the body design, an attempt has been made to keep the air space at a minimum under different loadings.

Bodies on the semi-trailer and the

(Turn to page 216)



2 Lines Here Will Tell You—

Safe Storage R.H. and Warmup

R. R. HAUGH
Quartermaster Food & Container Institute for the Armed Forces, Chicago

Shifting cases of food from a cold warehouse to a warmer transfer-room or storage area may cause damage to both fiberboard containers and the food packages inside. Injury results as water is condensed and absorbed from the surrounding atmosphere, supersaturated at case and package temperature.

However, moisture pick-up can be avoided merely by adjusting the temperature of either area or the humidity of the warmer one. Whether or not the transfer is safe can be quickly determined with the handy nomograph presented above. Also indicated are changes necessary for safe transfer.

First, mark the left scale at the temperature in original storage area. Next, on the middle scale, checkmark temperature of the transfer area. Then connect these two points with a straightedge and project across to the third scale—on which you thus get the reading of maximum allowable r.h. in transfer area for safe storage.

Now, if the actual humidity of the receiving area is too high, a reversing of the chart-reading procedure will indicate changes to make. Just draw a line from the point of receiving-room humidity on the righthand scale, back through the mark made earlier on the center scale, and on to the left scale—thus getting a reading of temperature to which the cool room must be raised before transfer is made. Alternative: Cut transfer room r.h.

Bag-Form Quick Coffee Boasts Brewed Flavor

Concentrate and fresh-roast product are mixed by Jewel Tea Co. to combine convenience feature of former and high quality of latter

Mix that targets true taste

It's sold in cans of 24 bags

FE STAFF

Progress in "convenience" coffee has reached a fervent pitch these days.

In the past year alone, three new powders, two liquid concentrates, and portioned coffee in bags have appeared. And at least five new patents have been added to the hundred-odd inventions aimed at simplifying the chore of coffee making in the home.

But the fact is that the rank and file of housewives still cling to their pot routine—"The new ones just don't taste the same," many say.

Jewel Tea Co., Inc., of Barrington, Ill., is one of those concerns that believe they have the answer to this poser. Vice-President W. A. Gerbosi puts it this way:

"In the usual manufacturing process for instant coffee, it is necessary first to make a brew from freshly roasted coffee and then dehydrate it. As the water is driven off, the extremely volatile aromatic coffee oils are likewise driven off. Every one is aware of this fact as he grinds coffee in his own kitchen. It is the volatile coffee oils in the roasted coffee which gives the pleasant aroma during this grinding process even at room temperature. The presence of these volatile oils makes the biggest difference."

Bag Approach

After several years of experimentation, the company has come out with a product which, it believes, licks this "lost flavor" problem while still strongly retaining the desired convenience factor. The new item* is a mix combining concentrate and roasted coffee, put up in conventional tea bags.

The double virtue claimed for the new product is this—*it offers the quick solubility and compactness of instant coffee while adding the flavor and aroma incident to fresh extraction.*

Briefly, the product is compounded in this manner: Fresh roasted coffee is extracted by a bulk process and the extract is evaporated down to a heavy syrup. This syrup is then applied to a well-sifted, freshly roasted, and medium ground coffee in a continuous mixer. The resultant slurry is then flash dried, cooled, and run into regular tea-bag packaging machines.

How does this product differ from similarly bagged simple-ground coffee products? For one thing, the bag need only be about one-third the size, since the concentrate is so highly effective in supplying strength and body to the brew. Further, brewing action in the cup is rapid, whereas normal hot water extraction of ground coffee alone takes considerably more time.

The peculiar physical make-up of the product explains its brewing characteristics and unusual keeping qualities. During the mixing stage, while part of the concentrate is absorbed by ground coffee particles, the rest forms a liquid matrix that hardens into a glossy coat covering each particle during the drying process. It is stated that this coat, in effect, "locks in" the aromatics of the ground bean portion and provides a shelf life estimated at from six to eight months.

When a bag is initially immersed in hot water, the concentrate coating goes into immediate solution and, like with conventional powders, no smell of the familiar brew is detectable. However, in a few seconds a normal strong coffee aroma develops when the exposed regular-roasted ground coffee is extracted. The length of time of bag in the cup determines brew strength—2 min. being average.

Besides its aroma quality, another difference is noted. The new product's extract has a misty or clouded appearance with no appreciable sediment in the cup.

Actually, the company is cautiously testing its product. And while checking public reaction, production is limited, with current handling of about 20,000 sale units per week.

The new manufacturing process is flexible, allowing for changes to be made to vary the end-product. However, it took two years of pilot operation alone to develop the present key techniques of mixing, feeding, and drying.

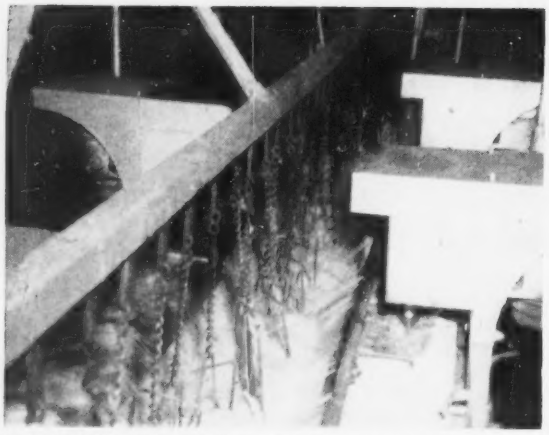
Turbo Mixer Integrates It

A continuous turbo-type mixer is used to integrate the concentrate with fresh-ground coffee. This apparatus, as well as the trough feeding mechanism serving the dryer, and the dryer itself, contain several modifications.

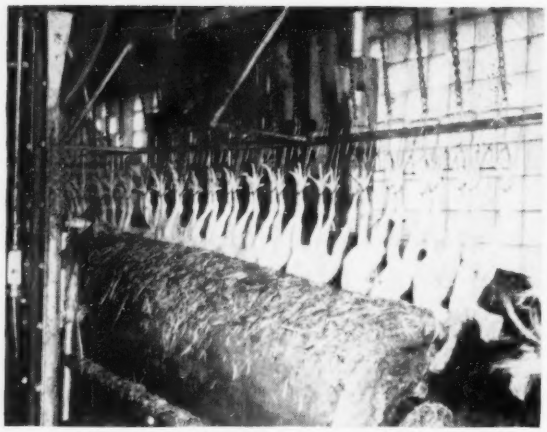
In essence, the dryer is a high-speed continuous unit employing a countercurrent hot air stream and impellers to move the slurry through the drying medium. Passage through the dryer takes about 1 sec. The product then travels on a belt for air cooling prior to handling in the packaging room.

Currently, the new product has been offered only to consumers in the company's home-route distribution system, which offers the convenience of direct customer explanation and demonstration. Reception has been reported as uniformly enthusiastic, hence introduction into Jewel chain stores is anticipated in the near future. The vacuum-pack can of 24 bags designed for this service will probably sell for around 60¢.

* U. S. Patent 2,224,942, Dec. 17, 1940; Jewel Tea Co.



1 **CONTINUOUS** scalding for 1½ min. in vat equipped with agitators loosens hard-to-remove feathers.



2 **FEATHERS** are mechanically removed by five machines on each of the two processing lines.

Better Broilers Processed *Better*

Swift turns out top-notch product at rate of 4,600 birds hourly on half-mile conveyor system. Using advanced machines and cost-cutting methods, it ushers in greater efficiencies in mass production of meatier chickens

P. G. MENSING and C. L. MORRIS

Plant Manager and Plant Superintendent, Swift & Co., Georgetown, Del.

Sought by leaders engaged in breeding, feeding, processing, and handling chickens is Quality-Plus "with a capital Q and P."

And this is the goal that has been achieved by Swift & Co. through its contributions to the development of a superior "tender-grown" chicken.

The techniques emphasize safeguards to assure a top product, yet permit mass processing that affords advantageous cost cutting.

It all started back in 1938 when experimental work was initiated on the production, processing, and distribution of improved-meat chickens.

Teamed with Swift in this project were poultry breeders, scientists (in industry and state and federal experiment stations), engineers, feed manufacturers, and plant-operating men.

Rewarding this search was the development of a high-energy feed—one with a low feed-to-meat ratio. And, when fed to chicks in accordance with improved techniques, a tenderer, plumper, meatier chicken was produced within a shorter time.

Within a decade, the amount of feed required to produce a 3-lb. chicken has been slashed from about 14 to 9 lb. Moreover, feeding time has also been cut from about 14 to 10 weeks. This, of course, means a younger chicken supplied at lower cost.

But producing a superior broiler- or fryer-type chicken within a shorter time was only part of the story. Birds had to be selected that could be readily machine-cleaned of feathers. Also, they had to be free of hard-to-remove pin feathers, which materially slow down processing operations.

To span the gap between poultry producer and consumer, Swift's engineers and plant operators joined forces. Advanced equipment and processing techniques resulted, speeding operations and pushing down production costs. And because of the new emphasis on skill and care, consumers are now assured of top-quality broilers.

This team has made notable developments in the dressing, chilling, eviscerating, and packaging of chickens. Some of the innovations are now being used by other processors, through licensing agreements.

9 Times Faster

Several years ago, top speed was about 500 birds an hour in most processing plants. Today, at one of Swift's plants—Georgetown, Del.—chickens move along an overhead, roller-bearing conveyor at the rate of 4,600 hourly!

Details of operations at the Georgetown plant will serve to spotlight the major steps in processing and in promoting uniform quality in the handling of a large amount of birds.

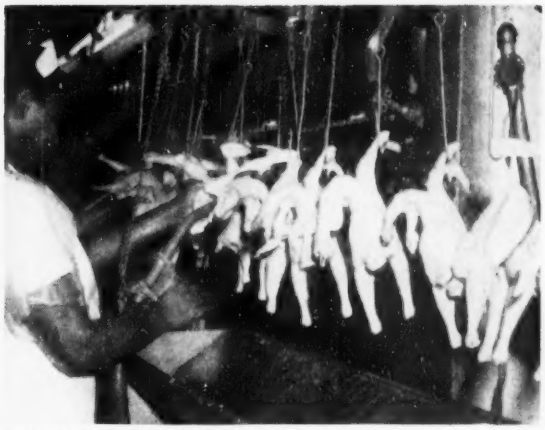
Birds are trucked from farms within a 50-mile radius by a "catching crew." Then upon arriving at the plant, the wooden coops holding about 18 chickens each are roller conveyed into a 40x60-ft. receiving room. Two men next switch the chickens into four-tier batteries, each holding about 125 birds. Empty coops are conveyed to an outside 40x60-ft. loading dock, where they are picked up by the catching crew.

Batteries are scaled empty, then loaded with birds, and rolled to the feeding station. This room is kept at about 80-85 deg. F., and it holds 265 batteries. Here, birds are fed to regain weight lost during shipment to the plant.

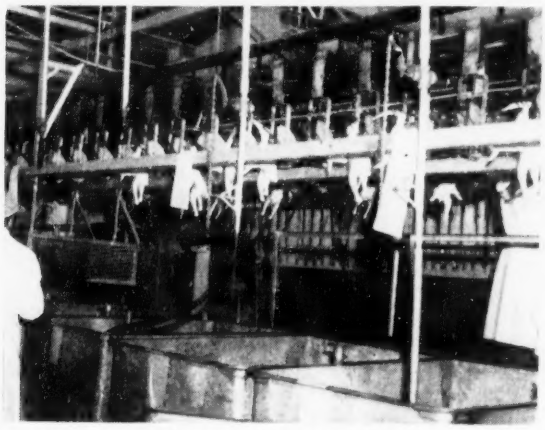
Empty batteries are returned to the receiving room for cleaning. Here, manure is scraped from pans into a V-shaped, floor-level, 25-ft.-long trough. A worm-screw conveyor at the bottom of the trough carries the manure to a bucket elevator outside of the plant for delivery into trucks.

Start of mass production is in the feeding room. Two men remove feed troughs from the batteries, while another worker rolls the batteries of chickens to two 2,300-birds-per-hr. processing lines that run parallel to each other. Men on each line suspend chickens by their legs on overhead conveyors. Production—from the time

3 **LININGS** are quickly peeled off gizzards by turning, threaded rolls of Swift-developed skinner.



4 **VACUUM** unit, devised by Swift, removes lungs from eviscerated birds. Thorough washing follows.



5 **AUTOMATIC SIZER** scales chickens into nine weights, simplifying packaging into different-size cartons.

6 **BY BUBBLING** air into chill vats, new Swift method substantially reduces chilling time of broilers.

the birds are shackled on conveyors until they are packaged—takes about 2½ hr.

The two conveyor lines continue into a 40x120-ft. defeathering or dressing room. After killing, the blood drains into a collecting trough, from where it goes to a byproducts plant that employs it as an animal-feed supplement.

Now the birds are ready for defeathering—a nine-step process designed to assure production of featherless chickens.

Scalding in 126-deg. F. water is the first step and is continuous. In this 1½-min. travel through a 3½x32-ft. tank, difficult-to-remove feathers are loosened with the aid of a dozen vertical-type agitators. These circulate the temperature-controlled water by pulling it from the bottom of the tank through a 15-in.-dia. pipe to the surface. Fresh well water is fed along the top of the scalder through a perforated pipe. Overflow goes into the sewer.

It may be pointed out that water is pumped from a well at the rate of 600 gpm. There are two auxiliary wells, ready in the event of an emergency. This large volume of water is used to clean the birds during various stages of processing and also the plant.

Continuous Defeathering

Removing garter feathers from the leg joints is one of the most difficult tasks. At this plant, it is accomplished by a specially designed garter-picking machine, comprising two 2½-ft. rows of rubber flails mounted on vertical shafts. Each row meets, travels downward several inches to remove garter feathers, separates—then is ready for the next cycle.

Bulk of the feathers are now removed by an 8-ft.-long roughing machine. Equipped with a hand-operated hydraulic lift, this machine is adjustable for handling different size birds. Feathers are removed as the chickens are conveyed between rotating rubber flails mounted in six rows on each horizontal shaft. Flails are 12 in. long and of ¼-in. dia.

Before traveling through the next defeathering unit—the back machine—each bird is positioned by a girl so that the back faces a set of horizontal rolls about 4 in. higher than the other. This 6-ft-long equipment also is fitted with a hand-operated hydraulic lift. As the birds are conveyed through 6 in. rotating rubber fingers, back feathers are removed.

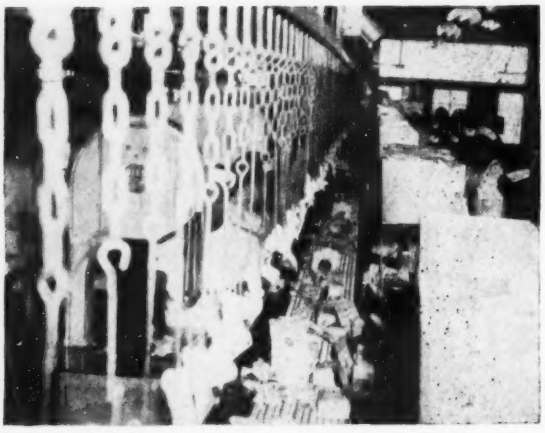
Leaving the back machine, birds are again re-positioned by a girl. Now with heads secured to shackle, the birds continue to a 4-ft.-long wing machine. Here, wing feathers and part of the neck feathers are removed.

Emerging from the wing machine, the birds' heads are removed from the shackles and the chickens advance to the neck defeatherer. This 3-ft.-long rougher is equipped with hand cranks for adjusting the angle of the two sets of 12-in.-long rubber flails.

Feathers missed by machines up to this point are now removed by a hand-operated rougher. Stray feathers are machine-plucked as a girl holds the feathered portions of the bird against the rubber cylinders of the machine.

Birds are inspected and pin feathers are manually extracted before the

ON THIS LINE, eviscerated chickens are cut into parts, and full sets are packaged in cartons and frozen.



CUT-UP PARTS line. Chickens are cut into thighs, drumsticks, wings, and breasts for individual packaging.

chickens move on to the singeing unit, which consists of two vertical pipes with gas flames.

For Better Safety

Two safety measures have been devised. One prevents injury to personnel; the other avoids damage to machines. To protect workers, hand-operated emergency stops have been installed at strategic points along processing lines—particularly where the lines travel upward or through a wall into another room.

Machine damage is prevented by using emergency pins in drive gears. These pins are grooved so as to enable them to snap before any damage occurs to the machine.

Washing immediately follows singeing. As the birds are conveyed through a 10-ft.-long, enclosed washer, they are cleaned of loose feathers by a pair of spinning rubber flails and six overhead water sprays.

Speedy Evisceration

Dressed chickens are carried directly through the chill room to the eviscerating line. Eviscerating and cut-up packaging lines are in a 60x120-ft. room.

In eviscerating the chickens, operators first shear off the feet. Others then inspect them for feathers, and also remove the crop, that drops into a V-shaped, stainless steel trough with a center drain pipe and two perforated water pipes on top. Another girl cuts off the oil sac.

Girls "vent" (open up) the birds, and others pull out the viscera, letting it hang for inspection by two federal veterinarian-inspectors. Bruised portions of the birds are trimmed according to requests of the government inspectors.

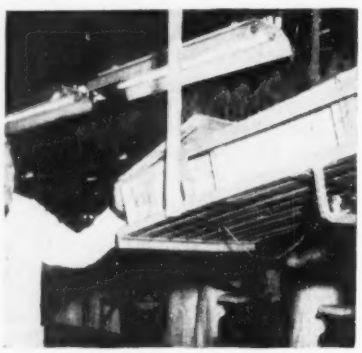
Livers are removed, washed, and placed in stainless steel, perforated pans. Other girls remove, trim, wash, and place hearts in similar pans. Gizzards are slit, washed, and put in additional trays. Finally, an operator pulls off the head.

Farther along the eviscerating line, operators insert a company-designed, trigger-operated suction tube into the cavity of the birds. Lungs and loose membranes are thus "vacuumed out" and collected in a waste tank. Another girl washes the insides of the birds with a stream of water from a hose. Operators then pull out the windpipe.

The broilers now travel through a 6-ft. enclosed spray-type washer. They then back-track through the eviscerating department to a Swift-engineered chill room.

Before entering this 60x60-ft. room, the trimmed birds are removed from the lines and deposited in a tank of ice. These chickens are later cut up into parts.

To facilitate subsequent packaging in different size cartons, chickens are automatically separated into nine sizes by an Altenpohl unit. Maximum size is 2 lb. 15 oz. and up, while the minimum size is under 1 lb. 4 oz.



EMPTY CRATES are fed to attendant on whole-chicken packing line from adjustable, shoulder-level chute supplied by overhead belt. As crate is removed, arm under crate springs up, operating switch to move another box into place.

This automatic sizer comprises a circular, overhead conveyor with nine track scales that actuate solenoids to release birds from a carrier, according to weight range, and drop them into 800 lb.-capacity chill vats.

Riding below this robot sizer is a rectangular bin. This is rolled under a conveyor scale to temporarily catch chickens whenever an operator needs to replace a loaded chill vat with an empty one.

Chill-Vat Details

The ice-chilling of broilers is now accomplished quickly by a new Swift process. Formerly, it took 16 to 18 hr. to cool them in conventional units. The new-chilling method is a major step in promoting more uniform, better quality poultry.

Rapid chilling is achieved in this manner:

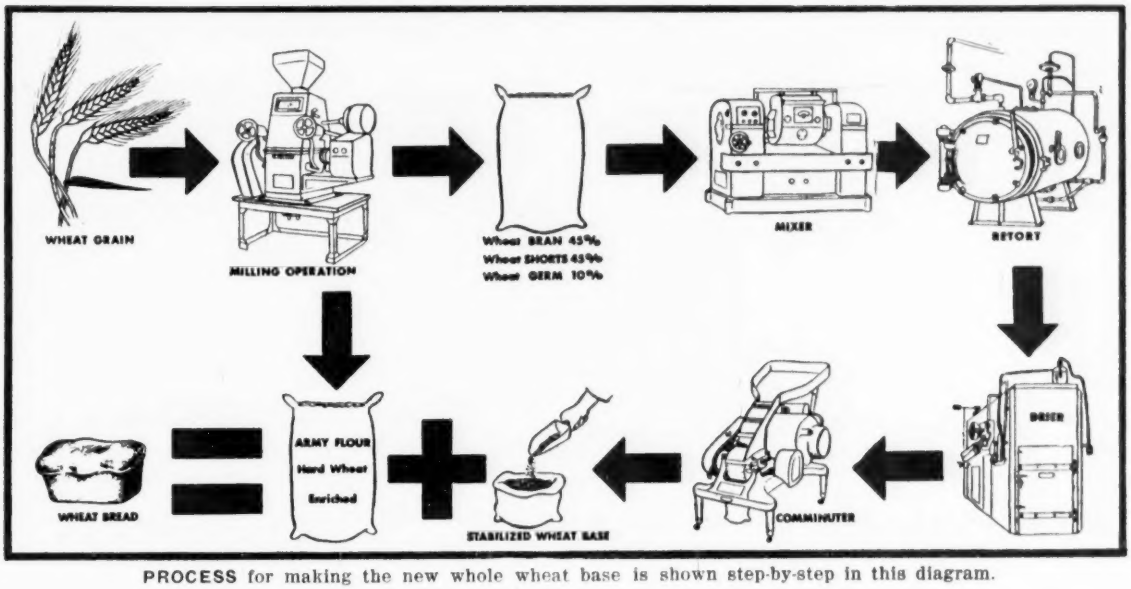
A pump delivers air, under a pressure of 2-3 psi., to 120 outlets. Attached to each outlet is a ¾-in. rubber hose with a perforated steel pipe, which is inserted into a chill vat.

Each vat has a colored tag—a different color representing the various size chickens. Use of these tags prevents delivery of wrong size chicken to the cut-up department. What's more, their use permits more speed than the former tags carrying figures, low on legibility.

Meanwhile, giblets are prepared for the packaging lines. Gizzard lining is removed by a company-developed skinning machine. By placing the gizzard against a set of threaded rolls revolving toward each other, the lining is peeled off. A water spray attached to the unit washes away adhering bits of lining.

The gizzards are then cleansed in

(*Turn to page 233*)



PROCESS for making the new whole wheat base is shown step-by-step in this diagram.

QMC Develops Extremely Stable Whole Wheat Base

Makes bread with whole wheat qualities.
Will keep a year at 100 deg. F.
Has commercial possibilities.

FE STAFF

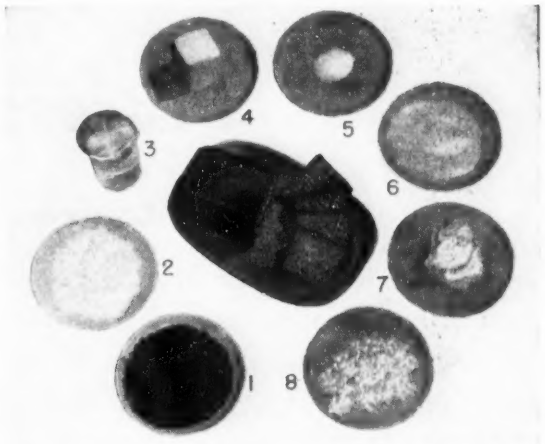
Soldiers overseas give up civilian eating habits with highly articulate reluctance. Hence researchers at the Quartermaster Food & Container Institute have long been acutely aware of the rather limiting effect that solely white flour has had on the standard "A" ration.

Poor keeping qualities have kept whole wheat flour from the menu. In warm weather, whole wheat would give evidence of off-flavors in a matter of weeks—a too short time for subsistence planning. Also, it's generally unavailable overseas and requires lengthy shipment.

Today this problem has been handsomely solved with a "Stabilized Wheat Base" that is capable of storage for 1 yr. at 100 deg. F. And this product makes bread and muffins, etc., that compare favorably in texture, appearance, and eating qualities with white bread.[1]

Developed by Joseph Cryns, technologist in the Cereal & Baked Products Div., the new product consists of a heat-stabilized mixture of wheat germ, wheat bran, and wheat shorts. It already has been authorized for military use (MIL-W-3705, Wheat Base) as a result of successful pilot plant production by Pillsbury Mills, Inc., and also extensive field tests. (*Turn to page 181*)

[1] According to Federal Law, a bread no longer can be labeled "Whole Wheat Bread" unless made from 100 percent whole wheat flour. The usual Army mixture is 50 percent whole wheat flour, 50 percent white flour.



PRODUCT made from whole wheat base, and ingredients used: (1) Wheat base, (2) white flour, (3) water, (4) yeast, (5) salt, (6) sugar, (7) hydrogenated shortening, and (8) dry milk solids, nonfat.

TABLE I—FORMULA for Whole Wheat Base

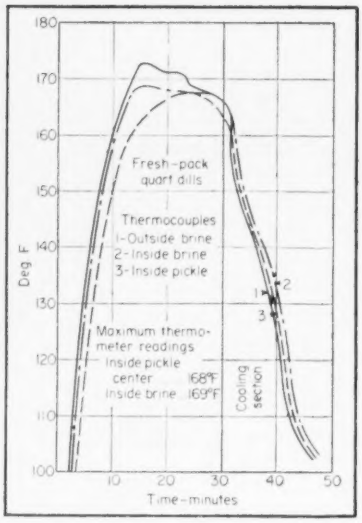
Ingredient	Parts by Weight
Wheat germ	10
Wheat bran	45
Wheat shorts	45
Water	25

TABLE II—WHEAT BASE BREAD Gets High Taste Rating

Based on a 9-point hedonic scale. (See FE July 1952, p. 50). This tabulation is the result of 200 testings.

Item	Mean Rating*	Percent Dislike
Wheat base bread	6.80	8.6
Whole wheat bread	6.89	5.3
Wheat base rolls	7.22	5.3
Whole wheat rolls	7.42	4.9
Wheat base muffins	6.26	12.4
Whole wheat muffins	6.04	18.1
Wheat base griddle cakes	6.50	14.8
Wheat base apple crisp	6.18	21.4
Butterscotch wheats	6.83	10.5

* Score of 1 equals extreme dislike; 5 equals neither like nor dislike; 9 equals extreme like.



VITAL ROUTINE AND CURVES. Checking pasteurizer-zone temperatures assures optimum performance. While data are noted, engineer "trims" settings on each zone controller. Right: Chart of typical pasteurizer run. Curves are derived from recording-potentiometer readings, made via thermocouples located inside and outside a moving jar. Note that heat rise is gradual, and temperatures tend to stabilize in critical pasteurizing zone.

Processed-Paced Quality

—Gives Precise Corrections That Counteract Errors Before They

Gedney has got it—thus assuring top performance in the critical continuous pasteurization of its new fresh-pack pickles. . . . Here are the working details of its comprehensive threefold program

DELOS WALLACE

Manager, Pickle Operations, M. A. Gedney Co., Minneapolis, Minn.

To get a proper evaluation of our quality control program for fresh-pack pickles, let us first air a "fact of life" that—unhappily—is only too familiar to anyone who has made this product.

That fact is that everything seems to conspire in this process to prevent a theoretically possible and highly desirable 100 percent spoilage-free pack.

Pasteurization—"heart" of the process—simply involves bringing the product in the center of its container to 165 deg. F. and holding it there for 15 min. Excellent machines have been devised to attain this widely safe heat treatment.

But so many variables play a role prior to pasteurization that in short order this "simple" operation can be strung with complications well beyond the capacity of an average pickle plant.

Coping with such problems is the pertinent job of quality control, hence the field of fresh-pack operations has become an initial site for the veritable revolution in precision and scope that has been sparked by the control technique.

Here in the Chaska, Minn., plant of M. A. Gedney Co., we are favored by having a new facility especially built for fresh-pack. Its equipment is of sanitary design, well-engineered, and intelligently laid out.

But nevertheless, major credit for our successful operation must go to a comprehensive, "in-stream" quality control program that—

. . . protects against quality deterioration prior to pasteurization through constant tests of cucumbers and equipment to detect and forestall bacteria build-up.

. . . prevents unreliable results in pasteurization through close control of such variables as jar fill, brine temperature, and brine level.

. . . assures exact pasteurization schedules through frequent, well documented, enroute checks of jar temperatures, pressure, and qualities.

Before enlarging on this threefold plan of "in-stream" quality control, it might be well to briefly note that an equally important fourth part of the program works to give us quality-minded personnel.

Lack of cooperation from in-plant personnel can quickly downgrade products in spite of the finest equipment and lab control procedure. At Chaska we have attempted to stimulate employee interest in his product by periodic training sessions dealing with all phases of fresh-pack production. Further, with this background a worker need not be confined to a single station. His work can be broader, thus eliminating job tedium.

Since installing this program we have been particularly gratified by the ready response accorded the directives from our quality control group.

Protective Control

In listing our three quality control fundamentals we indicated a "protective" function. To us this simply means the protection of field-fresh quality—from harvest into the sealed glass jar.

Quality does not improve once

PERIODIC TESTS of in-jar product qualities during the various stages of pasteurization enable Gedney to make certain that process settings are at optimum in correlating with the desired results. Handy central location of test bench (above) saves precious minutes in control program.

Control

Can Become Significant

fruit is off the vine, so a primary object of our control is to foster speed in processing. We attempt to expedite delivery from the field and to insure rapid movement through sorting and washing, with minimum retention in blanching and packing.

As a working maximum, we have established a 24-hr. period from vine to labeler and constantly strive to pare this time.

Proper variety and strain selections are important considerations in addition to fruit health. During this past pack we chose a National strain of the black spined variety as suitable for fresh-pack. Next season, however, we plan on using the new spot resistant SR-6.

Actual in-plant protective control begins at the washing and wilting (blanching) stations. Incoming cukes vary in the amount of adhering dirt and may require varying degrees of washing. A periodic swab of washed cucumbers and a plate test for bacterial count serves as a guide to washing efficiency.

Variations in wilting also take a toll in quality. Lapse of time from picking affects the speed of wilting, and "older" cucumbers must be moved through the continuous blancher more rapidly. Also, excessive temperature or strength in the saline bath can actually cause an undesired curing, and salometer and thermometer readings are made frequently for check against the blanched product.

A vital duty of the blancher operator is to be sure no cucumbers remain in the salt wilt bath during rest and noon lunch periods—for curing would continue in this interim. It has been established that the maximum time from start of the salt wilt to packing in jars should be no more than 20 min. during the hot weather runs on pickles.

While pasteurization theoretically destroys all spoilage organisms in the fresh-pack jar, the problem of holding count to a minimum prior to this heat-treatment cannot be overstressed.

"Eases Burden"

For one thing, a low count eases the critical burden of the pasteurizer and further assures its perfect performance. And also, fermentative action by organisms on the cukes prior to pasteurization can greatly subtract from final quality and actually influence the heat-transfer requirements of the process.

Properly designed equipment is, of course, a major step toward low contamination. Wherever possible, we employ stainless steel at points contacting the product, and such contact surfaces are made accessible for easy cleaning.

Periodic swabs of process equipment are taken by the laboratory technician, and these are plated and checked for bacterial count. Wash-down frequencies and techniques stem directly from these findings.

Preventive Control

Prior conditions can vitally influence the success of the key operation of pasteurization. We term this second aspect of quality control "preventive" simply because the object here is to eliminate or prevent those non-uniformities in product and package that spell erratic results in heat-treatment.

Take an overfilled package for example. The pasteurizer—with temperature zones carefully set up for a certain brine-product ratio—can very well fall short of full heat penetration of such a package's inner product.

Variations in brine and washing temperatures are another example. Too cool a brine in some jars may result in insufficient heat penetration in the pasteurizer. And extra heat supplied by brine and washing may result in an overcooking.

As central control of packing uniformity we have a woman, right on the line, whose prime responsibility is such uniformity. Her duties consist of inspecting the quality of incoming cucumbers as they are delivered to tables—checking the empty glass jars for cleanliness and test weighing as many filled jars as possible. These checks are, of course, in addition to the regular jar inspection and check weighing performed as a routine by workers on the line.

At the brining, capping, and jar washing stations—all in a closely knit line in our process—an attendant is

"Finger on the Troubles"

Broadly spurred by consumer acceptance, the revolutionary new fresh-pack pickle technique — supplanting the old vat curing—is "guesstimated" as now spreading over half this processing field.

But—quality control problems have been numerous . . . And thus this article is particularly timely in putting the finger on these troubles and detailing success in a program toward their solution.

FURTHER, THIS MONTH'S FE FOLDOUT FLOWSHEET—"MAKING FRESH PACK PICKLES"—TAKES YOU RIGHT TO GEDNEY'S CHASKA, MINN., LINES TO VIEW ITS MODEL STREAMLINED LAYOUT. JUST TURN TO PAGES 174-177.

constantly on hand to check and realign on such possible variables as cover brine temperatures, short brining, and washing spray temperature.

It has been accepted in this field that vacuums and pressures obtained within the jar during heating and cooling have a vital influence on the attainment of the highly desirable white fresh look of the finished product. Abnormal internal jar pressures–and subsequent change in heat-transfer quality–can transform the product into an opaque looking pickle.

There has been considerable research to determine correct jar vacuum. It has been established that quality deterioration follows excessive vacuum in the jar, and close control at the closing station is necessary to limit vacuum to a proper value.

Assuring Results

The third and most comprehensive part of our quality control program–that concerned with "assuring" desired results–primarily has to do with proper pasteurizer operation and control. But before launching into a description of this, let us look more closely at the pasteurizer as such:

At Chaska, we use an 80-ft.-long, steam vapor-type, continuous-tunnel pasteurizer designed specifically for the installation by Homer Ohlhaver, of the White Cap Co., and fabricated by Standard Metal Products Co., Chicago.

It might be mentioned at this point that Mr. Ohlhaver–a pioneer in continuous pasteurization–and his associate Mr. Pacilio, also of White Cap, spent considerable time in perfecting our layout and process and provided invaluable aid in setting up our whole quality control program.

A mesh-type continuous metal belt moves the jars through the pasteurizer, which is sectioned into six separate zones, five for heating and one for cooling.

Live steam–sprayed into the atmosphere around the jars from orifices in pipes suspended above and below the moving belt–is used to vaporize or humidify air in the pasteurizer at a given temperature. And heat-transfer is accomplished by the direct condensation of this hot vapor on the cooler jar.

Because of this condensation effect, heating of the jar is very efficient and proceeds evenly with no cold-pockets. Condensate running off the jars is collected by a pipe system below the belt and can be returned to the boiler.

Cooling takes place in the last section of the pasteurizer by means of direct water sprays. At the very end of the unit, well water is used. And this is recirculated by two pumps, so that gradually warmed water is employed for cooling as jars leave the heating sections. This "water-tempering" system eliminates thermal shock of the hot jars and, of course, conserves on water usage.

Integrated Controls

A system of built-in automatic controls regulates the temperature in each zone. Thermal bulbs are mounted above the jars, and a pneumatic valve set in the live steam line to the section is positioned by the controller whenever there is deviation from its set-point.

Because of these separate zone controls, it is possible to quickly adjust the heating and holding time of the pasteurizer to suit jar size and product. Also, a variable speed drive on the belt and a tachometer to measure its movement permit capacity adjustments that can be meshed with the heat-balance in the unit.

At periodic points along the sides of the pasteurizer are small pressure-tight access and viewing doors. These allow direct observation and sampling of jars in any of the zones during process.

While many companies do not employ a pasteurizer operator, we feel that it is absolutely necessary for positive quality control. The young lady at this station spends practically all her time checking and maintaining the heating and cooling operation of the pasteurizer. She accomplishes this by using test jars that travel through the unit with the regular batch and are removed from access doors as desired.

Testing Procedure

In a typical testing procedure, after the controls are set on "automatic" for a definite size jar and style of cucumber, three rubber-band marked test jars are introduced into the pasteurizer. The first jar contains four maximum-reading thermometers spotted with bulbs in the top, lower middle, and lower outsides of the container. If possible, we like to maintain not more than a 4 deg. F. differential between these points in the product during pasteurization.

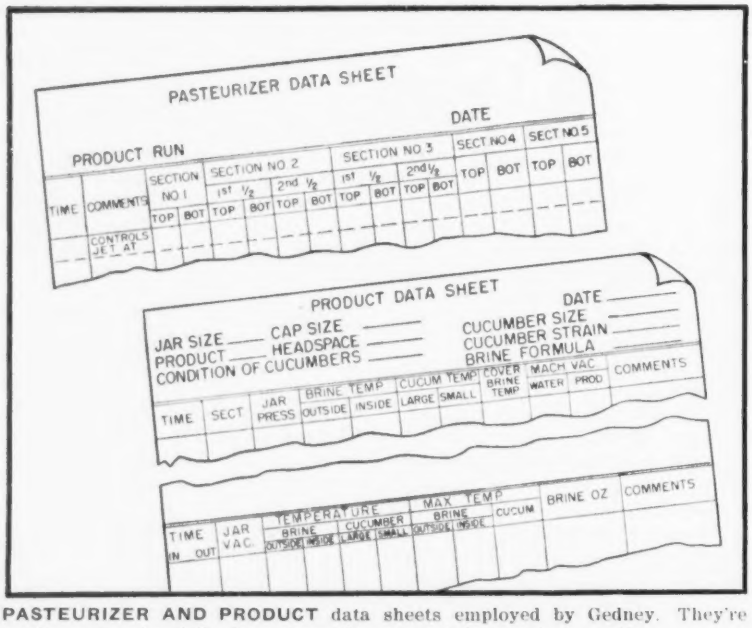
The first jar is permitted to travel the length of the unit, and all temperatures attained, plus the time of travel, are noted on a permanent record chart.

Next, the second test jar travels through and is removed where we want to hit our critical 168 deg. F. pasteurization heat. When taken from the pasteurizer, this jar is immediately punctured with a composite vacuum-pressure gage and its pressure is then recorded.

Following the pressure test, the cap is removed and four long-stem dial thermometers are located to measure at the same points as the previously mentioned maximum-reading units. These readings are also noted on the control chart.

The third control jar is removed from the pasteurizer at the end of the "holding" section–approximately 15 min. further down the belt than the start of the critical pasteurizing temperature zone. This unit is merely

(Turn to page 215)



PASTEURIZER AND PRODUCT data sheets employed by Gedney. They're made up to give full picture covering control factors in operation.

"Everyone gets an opportunity to contribute"

PREVENTIVE MAINTENANCE

Minimizes Costs, Clinches Output, Promotes Quality

PART II—The Role of Personnel . . . Type of worker, training, manuals, morale, conferences

GEORGE J. MARTIN
Manager, Mechanical Division, National Biscuit Co., New York City (photos from Nabisco's Portland, Ore., bakery)

Emphasis should be put on training and using your present personnel —if you are going to install and administer a truly effective preventive maintenance program.

No special type workers are needed. Your present mechanics can be trained to make preventive maintenance inspections in accordance with the procedures. At this point, the plant engineer must make sure that the right attitude is being developed. The entire concept of PM must be "sold" to the mechanics.

The idea that they are to *prevent* breakdowns must supersede the thought of their being standby men, ready only to make repairs when equipment fails, and then await the next breakdown.

Inspections (detailed in Part I, FE March) can be used for building up the knowledge and ability of all of the mechanics by rotating their assignments. This rotation system can be used also for teaching plant engineer trainees. It is a most effective method for building up their knowledge and self-confidence as well as getting them started on the procedures of scheduling the mechanics in their work.

Clerical Assistance

In the planned preventive program, the so-called extra help for the plant engineer would be a combination maintenance clerk and maintenance storeroom keeper for the small plant, or separate clerks and storeroom keepers for large plants. These clerks would relieve the plant engineer of the clerical details necessary in the controlled PM program.

The combination maintenance clerk and storeroom keeper in a small plant would prepare the work orders required as a result of the inspections and submit them to the plant engineer for approval. He would set up and control the tickler file for the inspection records and make up the monthly report. He would receive the time cards, work orders, and storeroom withdrawal orders from the mechanics.

In examining them, he would at the same time, derive the figures necessary to post on the equipment records, and also, for any other evaluation report that may be required. His function as storeroom keeper would entail keeping a perpetual inventory of spare parts and storeroom supplies, as well as issuing items requisitioned on withdrawal orders.

An additional function of a storeroom keeper in a small plant would be to handle and expedite purchases from local sources of supply, such as mill supply houses, under the direction of the plant engineer.

Where the operation is large enough to require a separate maintenance clerk and storeroom keeper, or several of them, the functions as previously described would simply be divided among them in phases convenient to handle the greater loads. It must be kept in mind that this clerical help is there just as an aid to the plant engineer and can be expanded or contracted as required.

In some cases, installing and operating a preventive maintenance program would require additional help or additional overtime in the initial period. But within three to six months the effects of the program should reduce the work load to a point where less personnel or hours will be required than before the program was initiated.

Schedule Factors Cited

The determination of the inspection schedules is a subject of debate, because correct frequencies depend on many factors, such as age of equipment, condition, hours of operation per day, and importance of the equipment to the production line.

We have a tabulation of production, mechanical, and electrical equipment items listing the inspection frequencies that were established during conferences among production, engineering, and maintenance personnel. Accordingly, these frequencies represent a consensus.

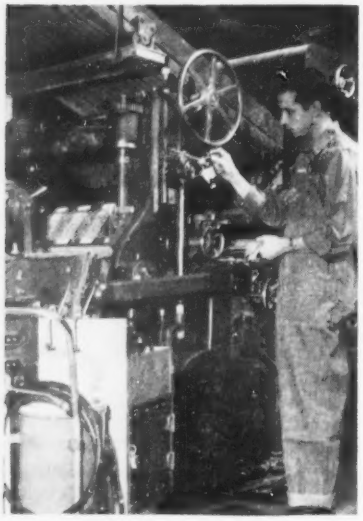
Operating conditions and production requirements differ in each of our plants. Therefore, it may be necessary to inspect some equipment more frequently; other equipment less frequently. Judgment here may best be made by the plant engineer after observing results from the inspection reports and deciding whether the established frequencies are satisfactory for existing conditions.

Not all of the equipment items we have listed are essential to keep our plants in operation. But periodic inspection of all equipment that requires maintenance, lubrication, or contributes in maintaining maximum production *is* necessary.

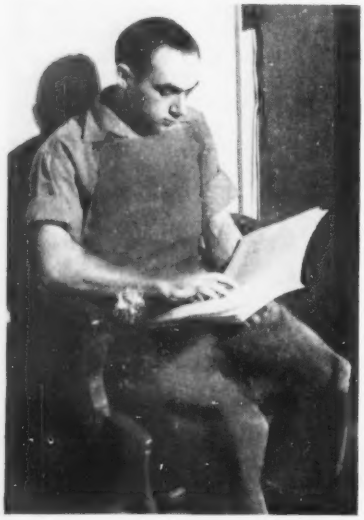
Measure of the effectiveness of an inspection schedule does not lie solely in reduced maintenance costs. Reduction in delays and increase in equipment life are also pertinent gages.

In the days of simpler units, a good

"Relieves key men of details"



"Trained to follow color code"



"Manuals are musts"

mechanic could attend to maintenance without specific instructions. Today, however, certain aids are essential to help him perform his work, since equipment has become more complex and its maintenance more exacting, particularly preventive maintenance.

Manuals Needed

To standardize practices and procedures, schedules of inspections, check points for equipment, and the like, manuals are "musts". And here the preventive manual is basic.

Furthermore, virtually all manufacturers issue printed instructions on how their equipment should be operated and maintained. Practices and procedures that have proved their worth are usually known to the plant engineer. Yet it has always been a problem to find a satisfactory way to distribute this information to the shop.

Accordingly, it is recommended that supplemental collective manuals be issued which include these instructions from manufacturers on installation, operation, and maintenance. Changes in plant engineering department routines should also be covered here.

This system is an excellent way to accumulate and issue new ideas and techniques to service personnel—such material, for example, as latest data published in periodicals. Thus, when the plant engineer learns of new "twists" in an article, he has the means to pass them along to all of his personnel.

The high value of all this information to service personnel is evident. A word of caution here: Selective care must be exercised in order that such instructional pieces are not overdone to the point where the mechanics tend to disregard them as just "so much more paper."

Lubrication

A study of the causes of mechanical breakdowns will show that a very large number can be attributed directly to lack of proper lubrication. The losses caused by failure to lubricate all necessary points and by breakdowns resulting from the use of the wrong lubricant are enormous.

In order to overcome these losses, we made a lubrication survey at each of our plants. We then developed lubrication standards which have resulted in the use of a standard list of oils and greases, scheduled frequencies for lubrication, standard fittings, and employment of centralized and automatic lubrication equipment.

When new equipment goes in, decals indicating type of oil and frequency of lubrication are applied to all the lubrication points so that the oiler can follow a simple color code for all of his work.

Since lubrication of machinery and equipment is scheduled as part of the PM program, we have made every effort to train our oilers so that they are fully familiar with the lubricants and the procedures.

During his tours, an oiler has the opportunity to examine a great deal of equipment. And he makes out a report on units that appear to be overheated or vibrating, or have loose bearings, or oil leaks. This information is of great value to the plant engineer. In fact, it is occasionally credited for preventing a breakdown.

Building Care

Preventive-type inspections are made of buildings and building equipment in the same manner as for machinery and equipment. However, here the scheduled frequencies differ. For example, we inspect our roofs, floors, stairways, walls, ceilings, and painting every six months—once in the Spring, again in the Fall. The same frequencies are used for our heating systems. Elevators, boilers, and pumps are inspected more frequently.

The program in any plant must be well planned to fit the requirements. Once it is drafted, covering scope of activities and the forms to be used, it is essential to fully explain the entire program to the foremen and craft heads. Thus, they will be in a position to supervise its operation properly as well as answer any questions that may be presented by the maintenance personnel.

In many of our plants we have the craft heads screen the inspection reports submitted by the mechanics under their supervision. This procedure has given them accurate information about the condition of all equipment, and they show great pride when the inspection reports indicate that their maintenance ability and effort is keeping the equipment in good operating condition.

Training Courses

Initial instruction and guidance? Yes! Reference to procedure in the preventive maintenance manual? Yes! But—a protracted "course" is not necessary. Preventive procedures make such good common sense that they sell themselves, hence the mechanics get the idea very quickly.

Matters like frequency of inspection and points to be inspected are learned through practice. Then periodically we check the procedures and the records being used to prevent mis-application and incorrect use. This will com-

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Food Engineering's

PACKAGING SPECIAL

★ AND SHOW GUIDE ★

Boosting Packaging-Line Efficiency

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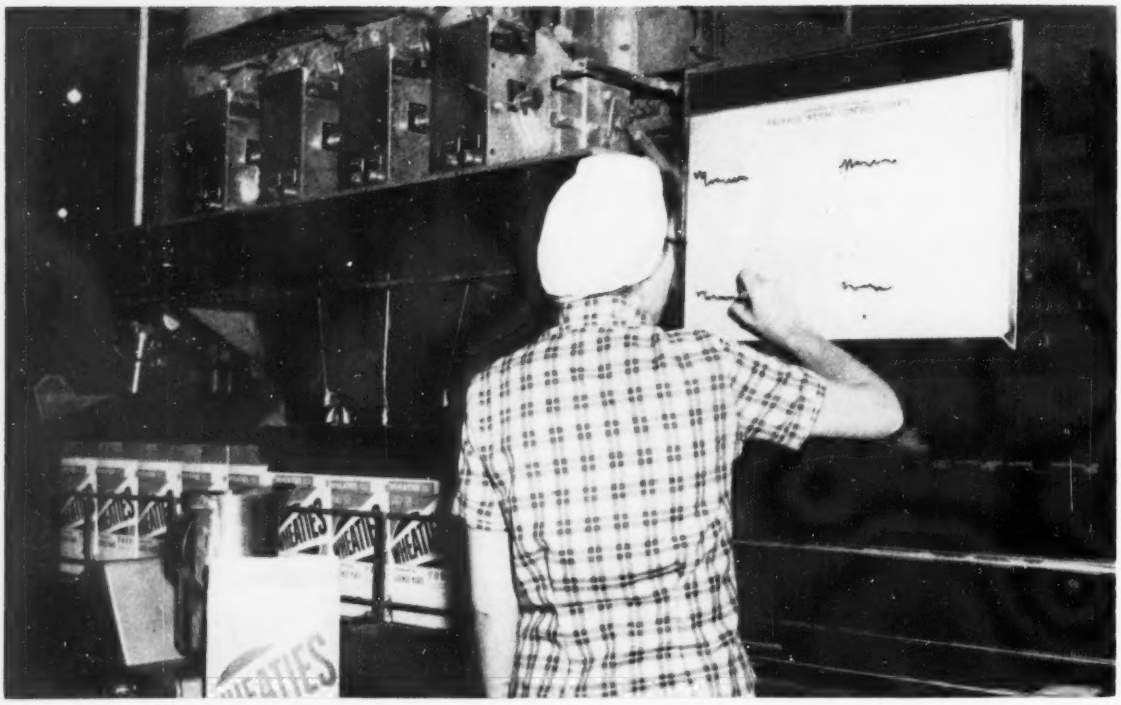
LATEST IN PACKAGING EQUIPMENT AND MATERIALS WILL BE SHOWN AT PACKAGING EXPOSITION, NAVY PIER, CHICAGO, APRIL 20-23

A Special Section of FOOD ENGINEERING, April, 1953



CONTROLLING FILL. Performance of filling machines is continuously checked by statistical control methods. Deviations from the exact weight of four packages are added and plotted on weight-control chart. If plotted deviations fall outside control limits, machine adjustments are made and again checked.

Gains Greater Packaging Efficiency by

Analyzing Line Performance

Here are the practical approaches taken by General Mills in surveying productivity on packaging lines. Important in avoiding line-downtime are checks on machine operation, on packaging supplies, and on weights

W. P. SCHOMMER

Cereal Manufacturing & Packaged Foods Superintendent, General Mills, Inc., Minneapolis

ANALYZING packaging-line performance is a big, important job.

Securing the necessary, correct data is not enough. More important is proper evaluation of the data.

Once the difficulties are pin-pointed, corrective measures must be taken. And line-performance must then be checked to make certain there are no further troubles.

Purpose of analyzing a packaging-line operation is to—

- **Establish performance standards.**
- **Determine reasons for failure in an effort to maintain the standards established.**
- **Learn what steps can be taken to improve these standards.**

To gain these objectives, it is necessary to carry out studies on equipment, packaging materials (cartons, liner paper, and adhesives), labor efficiency, product supply, supervision of personnel, and equipment maintenance.

There are many approaches to analyzing a packaging-line operation. And no doubt some are better than others.

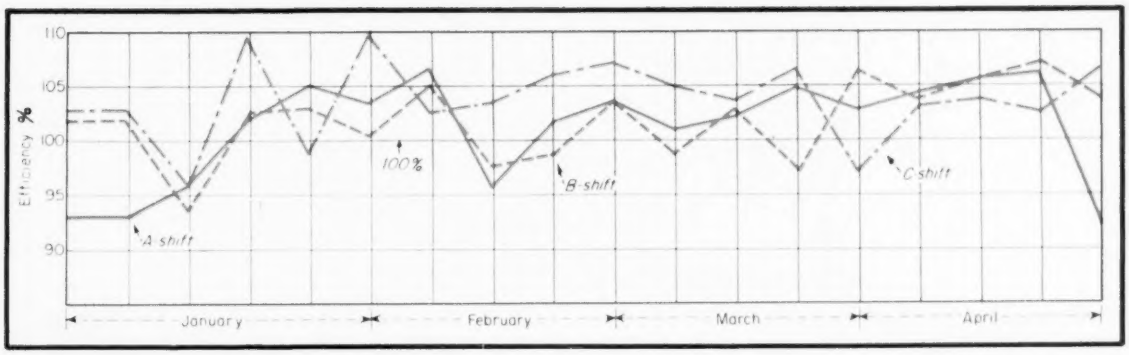
A great deal depends upon size of the operation, number of lines involved, types of equipment and products, hours of operation, and protection required.

How detailed should the analysis be? This can only be determined by experience. We have used two approaches—(1) analyzing on a continuing basis, and (2) employing a more comprehensive, concentrated examination (involving selection of a definite period, with observers assigned to each line to record the weak points, faults, or bottlenecks every hour).

The continuous method—a day-in-day-out type of analysis—is carried out in this manner:

Checking Production Lines

To evaluate production, counters are installed on all packing lines (at discharge of top-closing unit) to record the number of packages handled per 8-hr shift. Daily production records are kept for each item and posted in



EFFICIENCY of packaging line is charted on three shifts for current comparison and to show variations over long period. Sixty packages a minute represents 100 percent efficiency (cereals packaged in 7- and 8-oz. cartons).

a log book. These figures are available to supervisors, who can tell at a glance the percentage of operating efficiency.

Supervisors are credited for "out-of-product" time and standard relief periods. They receive no credit for lost time due to breakdowns, oiling, changing paper, and cleaning machines.

For example, let's assume that the standard for a product is 1,300 cases per 8-hr. shift. Then a log might show the following:

Shift	Output	Out of Product	Efficiency %
8-4	1,340	0	103.1
4-12	1,220	1 hr.	106.1
12-8	1,300	0	100.0

These daily figures are totaled at the end of the week and posted in the office of the packaging department (see chart).

Machine operators keep track of lost production, listing reasons and amount of downtime. Listed, for example, is 10 min. lost while waiting for a mechanic, 15 min. for the paper man to change a roll of film on a line, and 20 min. for getting more product. These explanations are daily recorded by the foreman for review by the head of the packaging department and maintenance supervisor.

Shift mechanics record their work on equipment and make recommendations for improvements in machine operation. These reports are also checked daily by top supervision.

A typical shift mechanic's report might read: "Adjusted stripping mechanism on package-maker line No. 1—line down 17 min. Fixed folding mechanism on top closer for line No. 3—line down 15 min. Replaced worn cam No. 171 on tight wrapper's folding mechanism on Bisquick line—line down 27 min."

Continual checking on packaging supplies is essential, since faulty materials cause a big portion of lost productivity. Warped, torn, and poorly scored cartons, as well as variations in caliper and density, are among the offenders.

Watching Packaging Materials

To keep a constant check on materials, we put each shipment of cartons through a runability test. This involves taking seven cases of cartons from various sections of a car. Cartons are then counted, checked for defects, and actually run on the line. A trained observer checks the run and records the results. And if there are production-line problems due to poor packaging material, a report is issued to be specific vendor.

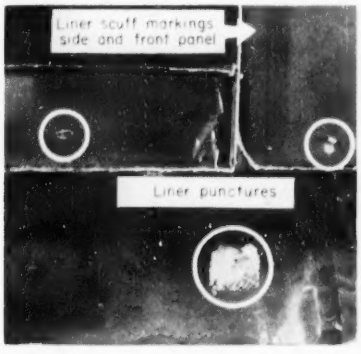
Where protection of product from moisture and infestation is required, liner fabrication is as important a performance factor as any other phase. Poor liner fabrication results in loss of product quality due to staleness or rancidity. And the impact will be felt in consumer purchases.

Most of our products need good protection. Therefore, we have set up a statistical quality control program for analyzing package-fabrication performance. This is the procedure:

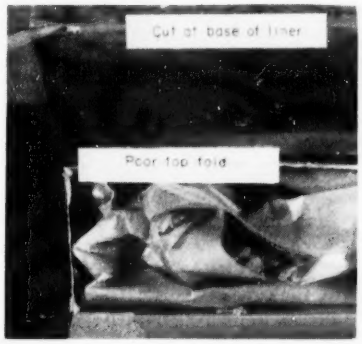
Each operator at a package maker

Poor Operations Make Bad Packages

LINER bottom and side seams improperly folded and sealed.



CARTON liners punctured and badly scuffed.



TOP of liner not folded. Base of liner has been cut (upper left).

POORLY sealed bottom and side seams. These cause spillage.

Packages Are Checked to Curb Line-Downtime

	Cartons			Liners								
	Side Seal	Bottom Seal	Bottom Alignment	Count	Double or Single	Side Seam	Bottom Closure	Cuts and Tears	Scuff Marks	Total Major Defects	Total Minor Defects	Comments
12:15	✓	✓	✓	8	S	✓	✓	✓	✓	0	0	
1:30	✓	✓	✓	8	S	✓	✓	✓	✓	0	0	
2:45	✓	✓	✓	8	S	–	✓	✓	✓	0	1	
4:00	✓	✓	✓	8	S	✓	✓	✓	✓	0	0	
5:15	✓	✓	✓	8	S	✓	–	✓	✓	0	1	
6:30	X	✓	✓	8	S	✓	✓	✓	✓	1	0	

Major defect = X Minor defect = – Total major defects → 1 2 ← Total minor defects

Bag paper vendor X Lone, No. 3 - Date 2/18/53 - Product, Flour

Carton vendor Y Operator, JJJ

Coupons 2 Package maker NO. 41 Top sealer NO. 301

Eight consecutive packages are taken off machine for each sampling. Cartons are first thoroughly examined, then liners are carefully removed and examined for cuts, tears, open side seams, and poor bottom closure.

A major defect involves entrance of moisture and infestation into package, and it is serious enough to warrant shutting down line to make necessary corrections.

A minor defect does not affect product keeping quality, but detracts from appearance of package. It should be corrected as soon as possible.

FORM I—PERFORMANCE of package-making machine is recorded on this form by operator.

Major Defects X / Minor Defects –	Line / Time	1							2						
Code date		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Code shift		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Overwrap															
Carton: Top alignment		X	✓	✓	✓	✓	✓	✓	–	✓	✓	X	✓	✓	✓
Bottom alignment		✓	✓	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	✓
Seal, top		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Seal, side		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Seal, bottom		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Product Spillage		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Liner (D or S)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Top closure		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Side seam		✓	✓	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	✓
Bottom closure		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cuts and tears		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	✓
Scuff marks		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Incomplete		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coupons		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Metal detector		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Total Major Defects		0	0	0	0	0	0	0	1	0	0	1	0	0	0
Total Minor Defects		1	0	0	0	0	0	0	2	0	0	1	0	0	0

COMMENTS: Line 1, Top alignment, adjusted. Line 2, Top alignment, Bottom alignment, Side seam open at top, adjusted.

Line	Number Checked	Defective No	Defective %	Total Defects Major	Total Defects Minor
1	8	1	12½	1	0
2	8	2	25	2	3

FORM II—PACKAGE-FABRICATION quality inspection report is made on this form by shift inspectors.

removes a package from each mandrel (8 mandrels) seven times a shift. These packages are first checked for minor defects in appearance. Then the cartons are removed so that the liners may be checked for holes, poor folds, or any condition likely to permit entrance of moisture into the product.

Form I (illustrated) is used by operators as a check on the performance of these package making machines. Each form is evaluated by supervisors.

Shift inspectors fill out Form II—a report on inspection of the quality of package fabrication. They check packages at the end of lines, just ahead of casing. Here are the steps:

Every hour, a package is removed from the casing table at the end of each line. The inspector then examines it for major and minor defects as well as checking on coupons and coding. This inspection is carried out in the same manner as that followed by the package-maker operators, but includes checking the top fold, top seal, and alignment of flaps. These checks are recorded on Form II, then summarized each day on another form. From the latter, we prepare summary charts as well as ones showing the percent defective for each packaging line.

Major defects affecting the keeping quality of a product are tears, holes, poor top folds, and faulty side steam seals.

Package weights are important from legal and economical standpoints. If scales are constantly overweighing, a considerable amount of product is given away. Consequently, the performance of our scales is analyzed on almost a continuous basis, using a statistical-control sampling method.

This check-up is similar on all packaging lines. Control limits, however, vary from line to line and from product to product. The operator of the filler takes four consecutive packages every 30 min. from each unit handling cereals and every 15 min. from each machine handling flour.

Shadograph scales, graduated in ½ oz., are used on each line. Deviations of ½ oz. from the exact weight is recorded for each package. The deviation for the four packages from a filler is added (see Form III), and then plotted on the weight-control chart for that filler.

If these plotted values are within the control limits, an adjustment of the filler is not required. However, should these figures fall outside the control limits, the filler is adjusted and checked until the scale is operating correctly.

The Comprehensive Check

The second large-scale analysis—the concentrated, definite-period check—can best be understood by reviewing steps of the last such study made at one of our plants. Here, we are interested in evaluating the performance of 16- vs. 18-point carton board.

A test was set up by our methods engineering section to compare the two boards and to account for the difference between the running speed of the line and the actual production rate. It was conducted over a 30-day period on two high-speed carton-liner type lines. To accumulate the data, a recorder-observer was assigned to each line on each of the three shifts.

Carton-runability data covering a 24-hr. period were filled out on Form IV. With this data, we attempted to analyze downtime attributed to mechanical failures, defective cartons (warped or torn), or miscellaneous reasons. Reasons for downtime are also put on another form for the file.

Based on Full Time

The final data excluded runs of less than 5 hr. duration and in which there were more than two changes in the day's schedule. The data are based on full operating time, with the exception of scheduled relief, shutdowns, and out-of-product time. They include normal machine interruptions. However, out-of-product and relief downtimes were recorded. Operating speed of the lines was kept constant throughout the runs.

Packaging Special

Results summarized below show superior performance with the 18-point board.

	Line No. 1		
	16-Pt.	18-Pt.	18-Pt. Gain
Packages (per min.) ..	55.7	63.9	8.2
Carton loss (percent)	1.1	0.5	0.6

	Line No. 2		
	16-Pt.	18-Pt.	18-Pt. Gain
Packages (per min.) ..	56.5	61.7	5.2
Carton loss (percent)	1.7	0.9	0.8

The 18-point board brought an average 0.7-percent reduction in carton loss, together with a 6.7-packages-per-minute increase in productivity.

Information accumulated in this test was further analyzed by our methods section—and here some startling weak points were revealed!

We found 40 percent of the lost production was attributed to machinery problems, 30 percent to running out of product, 19 percent to excess relief, and 11.0 percent to miscellaneous reasons (such as waiting for paper man, mechanic, or oiler). This meant that 60 percent of the lost production was due to other reasons than equipment.

Now what do these figures mean?

Let's assume that your performance standard is an average of 60 packages per minute. By eliminating the 60-percent unscheduled downtime, output would be stepped up from 60 to 69 or 70 packages per minute.

Detailed charts were prepared to present the information graphically. And the report contained the following comments and recommendations:

1. Out of product downtime—occurred quite regularly, covering periods from a few minutes to several hours. Average out-of-product downtime was approximately 1 hr. per day per line. This represented 30 percent of the total downtime, or a daily 100 (36-pack) cases which are not produced but for which full labor cost is expended. This downtime should be eliminated through improved coordination and planning within the processing department.

2. Relief downtime—indicated, by shifts, the actual relief time listed on the test-data sheets. When checked, it was noted that for several days the relief periods were closely maintained at the 10-20-10-min. standard. But thereafter, the operating crews backslid to what appeared to be a 15-25-15-min. practice. For the purpose of tabulations, an average 53-min. relief downtime per shift was used. This 13-min. excessive relief downtime accounts for 19 percent of the total downtime.

3. Miscellaneous downtime — consisted of waiting for oiler, paper man, mechanics, and completion of clean-up. Oiling and cleaning should coincide with scheduled relief periods. In many cases, the data indicated that this schedule was not being followed.

Waiting for the paper man is not to be confused with standard paper changes. It involves delay before the paper man starts his job.

Waiting time for the mechanic is similar. It also represents time lost prior to start-up—not while he is working.

Of the miscellaneous downtime, 28 percent is waiting for oiler, 45 percent waiting for completion of clean-up, and 27 percent combined waiting for paper man and mechanic.

4. Bottom sealer downtime—for 18-point board accounts for an average of 38 min. lost time per day per line. This is 30 percent higher than the liner—the next critical unit. The findings indicate need for study on bottom-sealer performance.

5. Liner downtime—averaged 27 min. per day, roughly two-thirds of the bottom-sealer downtime. Performance of the liner is considerably affected by the condition of shells and liner paper. Data indicate considerable difficulty with both.

It is probable that improvement in the bottom-sealer operation will turn out better set-up cartons, thus minimizing liner-operation difficulties. Since almost 30 min. are lost daily on the liner and a good portion is due to liner-paper difficulty, study of this problem is a must.

Of all the machine-caused downtime, an average of 50 percent occurs at the bottom sealer. Performance was about the same on 18-point and 16-point boards. From a mechanical viewpoint, improvement in bottom-sealer offers best possible benefits.

The lining machine accounted for a 28-percent downtime. Percentage-wise, the liner and bottom sealer resulted in an average 78-percent machine-caused downtime.

It is felt that improvemnt in the bottom sealer will automatically assist improvement in the liner operation. This is in conjunction with improved liner-paper specifications, and inspections should further minimize this deficiency.

Weight and Carton Runability Tests

SCALE NO. 1

TIME	SAMPLE NO.	WEIGHT CHECKS 1	2	3	4	TOTAL	COMMENTS
7 00	1	3	3	2	0	8	Adjust weights
	2	2	0	1	3	6	
8 00	3	0	-1	1	0	0	
	4						Down for relief 8 30 to 8 40
9 00	5	3	1	-1	-1	-4	
	6	-2	1	1	-1	-1	
10 00	7	1	1	-1	2	3	
	8						Down for lunch 10 30 to 10 50
11 00	9	-8	4	1	0	-3	Adjust weights
	10	4	-2	2	3	7	Adjust weights
12 00	11	1	4	0	-1	4	Adjust weights
	12						Down for relief 12 30 to 12 40
1 00	13	-8	5	2	4	19	Adjust weights
	14	-3	-1	1	-2	-2	Adjust weights
2 00	15	4	0	-2	4	6	Adjust weights
2 30	16	-1	0	5	0	4	Adjust weights
	17						
	18						
	19						
	20						

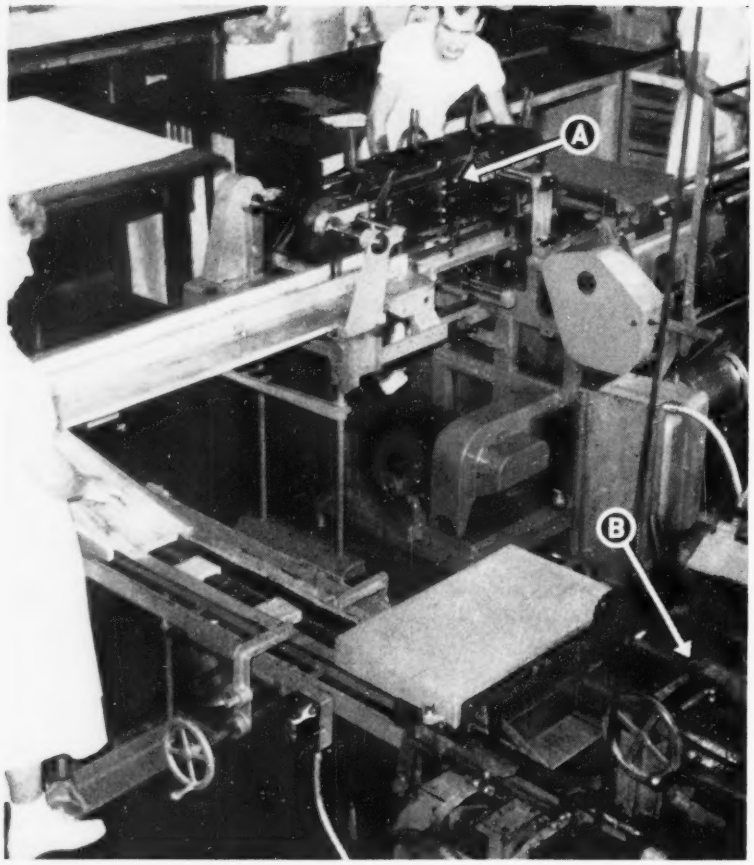
FORM III—STATISTICAL quality control package-weight data are recorded here. Unit of measure: 1/32-oz. deviations from 12 oz.

TIME	REGISTER READING		LINE NO	BOT SLR RATE	CARTON CALIPER	PACK FLOOR TEMP DEG F	PACK FLOOR HUMDY R.H.	RELIEF	DOWN TIME MACHINE BOT SLR	MACHINE LINER	MACHINE FILLER	MACHINE COUPON	MACHINE TOP CL	CARTON BOT SLR	CARTON LINER	CARTON TOP CL	CARTON LOSS REJECT	BOT SLR	LINER	FILLER	TOP CL	EXPLANATION
7			2	76	0185	76	46			10M							3	10	8	3	17	
6				76	0190	76	44		10M	5M							9	12	11	5	4	
5				76	0195	76	44											5	1			
4				76	0180	76	46											8	6	2	11	
3				76	0185	76	45										32	8	7			
2				76	0185	80	48		5M	10M							10	13	9		22	

FORM IV—RUNABILITY DATA for cartons from a particular supplier are recorded here. Information on carton losses is listed in right-hand columns.

$53,000 a year saving made through mechanization of packaging operation in cheese plant. Pays 207.7 percent return on investment in packaging equipment

C. R. HAVIGHORST
Senior Associate Editor,
"Food Engineering"



MACHINE-WRAPPING supersedes former costly manual wrapping. Slabs of cheese are first wrapped in Pliofilm (A), then go to cellophane wrapper (B).

Package Engineering Pays 207%

ENGINEERING a new package and a new packaging line to produce it is usually a cooperative project. Playing major roles in the act, along with the food processor, are equipment manufacturers and suppliers of packaging materials.

Take the case of Tillamook County Creamery Assn., cheese processor at Tillamook, Ore. Through skillful engineering teamwork this company has actually telescoped 20 years of cheese-packaging progress into the past 5 years.

This is the achievement: Curing the cheese in rectangular boxes instead of conventional cheese wheels . . . cutting the blocks of cheese into ½-lb. or 1-lb. slabs . . . and then machine wrapping these small units.

By this advance in processing and packaging, a mechanized method of prepackaging cheese in consumer-size units has been provided. Thus enabled are reductions in packaging and handling costs (see tables next page). What's more, by using protective films, quality and cleanliness of cheese is materially improved.

Because of its economies and efficiencies, this new technique lays the groundwork for promotion of increased consumption of cheese.

Development of the new cheese package involved a transition from a manual operation to a highly mechanized packaging operation. And, only recently, was the final engineering completed through this cooperative venture.

How It Began

Initial work on this new package was pioneered by Goodyear Tire & Rubber Co., who substituted a rectangular box for the conventional cheese-curing wheel. Cheese now formed in 20-lb., rectangular Wilson-type hoops fit into these boxes. The rectangular cheese blocks are then wrapped in Pliofilm and wax paper for curing (*Food Industries*, July 1950 p. 44). Formerly cheese wheels were bandaged with cloth and then wax-dipped—a costly, time-consuming process.

Tillamook began packaging cheddar in consumer size units in 1947. Then, four girls cut ½-lb. and 1-lb. slabs, which were then hand-wrapped with two separate films. At this time methods relating to the control of product and wrapping materials claimed the attention of the technical staff. Outstanding was Goodyear's curing innovation —the use of Pliofilm for a cheese-curing wrap and substituting rectangular boxes for cheese-curing wheels.

This technique was new, and personnel at Tillamook had to acquire "know how" before using it on a larger scale.

Labor Costs Cut $50,000 by Machine Wrapping

Labor savings machine No. 1	13 operators
Labor savings machine No. 2	13 operators
Total	26 operators
Labor used on machines:	
Feeding machine No. 1	1 operator
Feeding machine No. 2	1 operator
Weighing	2 operators
Casing operation on discharge of machine No. 2	2 operators
Total	6 operators
Savings in personnel	20 operators
20 employees at $2,500 per year	$50,000
Approximate savings on cellophane-sheeting (sheeting cost saved by using roll stock)	3,000
Total savings	$53,000

These savings are conservative, since the casing operation was also necessary during hand-wrapping and Pliofilm sheeting is now carried out by machine. Note: A girl wraps 6 packages and a machine handles 80 per min.

Investment Pays 207.7% Annual Return*

Total cost of two new machines delivered and installed	$24,000.00
Annual rate of recovery required to return investment, assuming 10-yr. life	2,400.00
Depreciation based on 20-yr. schedule (rate of tax-free depreciation normally allowed by government)	1,200.00
Portion of above amount ($2,400.00) which must be recovered from taxable profits	1,200.00
Earnings required before taxes (38%) to recover above amount—$1,200.00 ÷ 0.62	1,935.48
Total annual capital recovery required over 10-yr. period. $1,200.00 (tax free for allowable depreciation) plus $1,935.48 from profit (includes inflation for 38% taxes)	3,135.48
Total annual savings on machines (see accompanying table)	53,000.00
Annual net return required on investment for 10 yr	3,135.48
Net annual savings on new machines	49,864.52
Rate of annual return on capital invested in new machines $49,864.52 (net savings) ÷ $24,000 (cost of machine)	207.7%

*** Method of computing return based on approved methods devised by National Machine Tool Builders Assn. Note: Savings made by machines, converted into interest on investment, is accepted method of determining if machine purchases are profitable. The above tabulation considered the tax-inflated profit dollar.**

When manufactured to specifications, Pliofilm is an ideal wrap for curing cheddar. Its gas-transmission rates are acceptable for cheese curing.

Conventional method of wax-dipping cheese provides a close fitting skin, which leaves few air pockets for mold growth. Therefore, the film selected for wrapping large cheese blocks for curing and small slabs for consumers had to have this characteristic.

Suitable for this purpose is "tensilized" Pliofilm, which is stretched in one direction to a 40-gage thickness and to the required static charge.

This film, due to its static charge, clings closely to cheese. And this ability to cling is now aided by carefully controlling the "oiling-out" process of the small slabs.

Cutting Costs Four Ways

Costs are usually highest at the start of a new packaging operation. In most instances, they can be reduced through the combined efforts of the processor and suppliers of packaging equipment and materials.

Here are four cost-saving steps accomplished by the new cheese-packaging method:

First step—The original hand-wrapped package comprised 40-gage, tensilized and 80-gage, non-tensilized Pliofilm wraps. The heavy outer wrap provided shelf-protection for the thinner inner wrap. And the colored Tillamook label was reverse-printed on the outer film.

Tillmook's first efforts to reduce costs were aimed at wrapping materials—especially the expensive outside wrap. Tests showed that the inner wrap provided sufficient air exclusion to protect product quality. The outside film served merely for handling and merchandising purposes. As a result, less costly 300-gage cellophane was substituted for 80-gage Pliofilm.

Second step—This first economy was quickly followed by another—the installation of a Package Machinery Co. Model FA unit to mechanically apply the outer cellophane wrap. This film lends itself to mechanized wrapping, since it is readily heat-sealed—the outer coating is melted to seal the film. On the other hand, temperatures employed to heat-seal Pliofilm must be critically controlled, since the basic film must be melted.

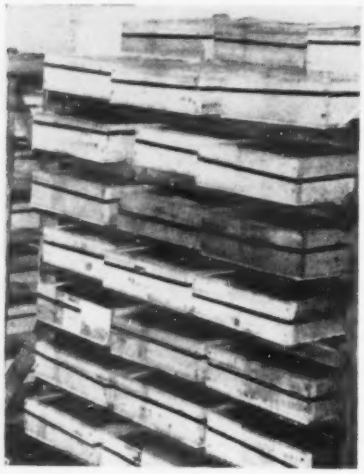
It was feared that high temperatures needed for sealing cellophane might occasionally perforate the thinner inner wrap. Also, this film posed other problems that complicated design and operation of the wrapper.

For example, the FA unit had to be equipped with applicators, which apply a thin film of Methyl Cellosolve solvent to the cellophane coating at the package folds. This seals the film without heating, provided sufficient drying time is furnished. However, to speed sealing, heaters are employed on the wrapping unit. These are set at 210 deg. F. to quickly dry the solvent and obtain an immediate, secure seal without puncturing the Pliofilm.

Third step—After installation of this machine, cost studies were made by Package Machinery Co. engineers. Especially interesting were the savings in labor and hand sheeting, which encouraged the engineers to investigate possible methods of mechanized wrapping of the inner sheet. This tensilized inner wrap is folded and not sealed.

The question was boiled down to five major problems: (1) Getting the "naked" cheese to slide easily over sur-

Step-by-Step Packaging Operations on New Line



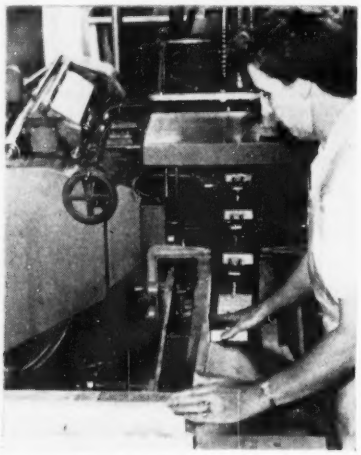
1 CHEESE, first wrapped in Pliofilm and waxed paper, is cured in these 20-lb.-capacity rectangular boxes.

2 REMOVED from boxes, cheese blocks are stripped of film and are now ready for the cutter.

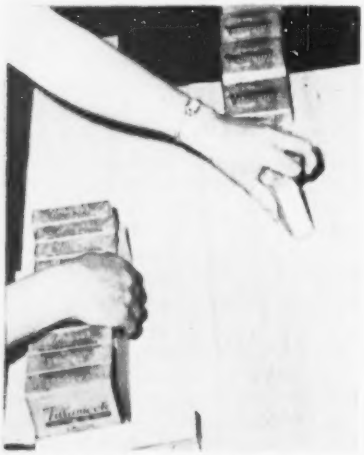
3 USING a butter cutter, girl forms the block into ½-lb. slabs. Pound slabs of cheese are also cut.

4 TO ASSURE consumer of receiving a full weight, each ½-lb. or 1-lb. slab of cheese is check-weighed.

5 SLABS of cheese are fed into intake of machine that wraps them with tensilized Pliofilm.



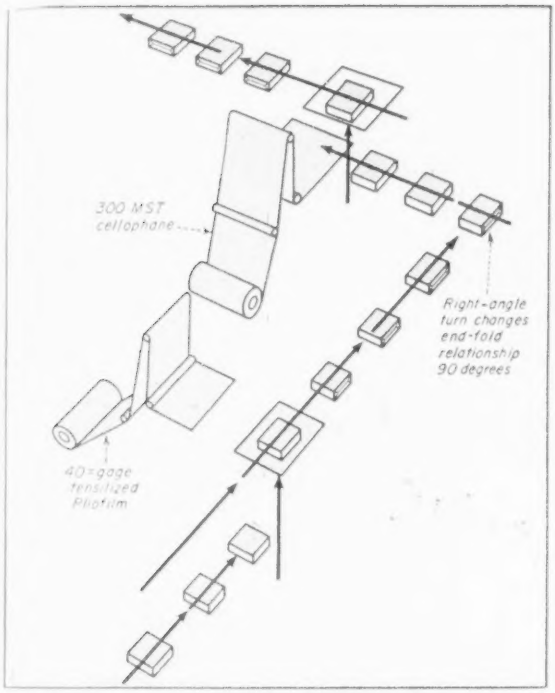
6 MAKING right-angle turn, Pliofilm-wrapped slabs are transferred to second unit that applies cellophane.



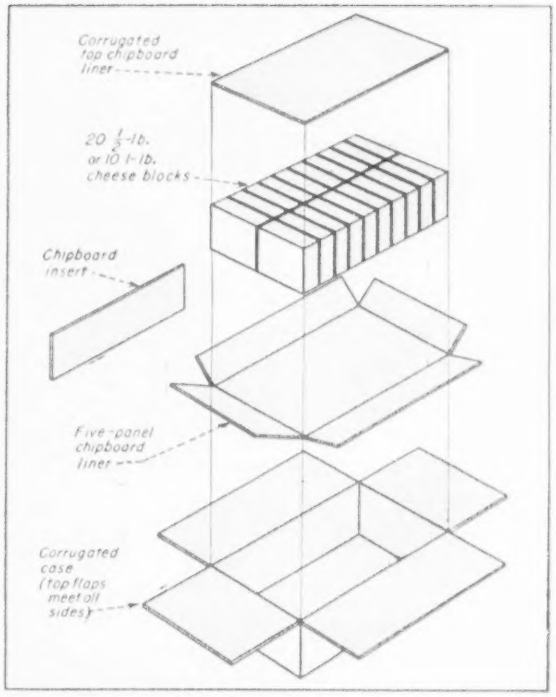
7 SPACER is inserted between slabs leaving second wrapping unit, arranging them in block for casing.

8 WITH the units assembled, block of cheese is then packed into stapled shipping case.

9 FLAPS of shipping case are hand-glued, and then pressure-sealed in unit (right).



PATH of travel of cheese slabs diagrammed. Slabs are machine-wrapped in Pliofilm, and then cellophane.


Corrugated top chipboard liner
20 ½-lb. or 10 1-lb. cheese blocks
Chipboard insert
Five-panel chipboard liner
Corrugated case (top flaps meet at sides)

HOW blocks of wrapped cheese are packed. Employed are three liners and a corrugated shipping case.

faces at intake of machine, (2) eliminating the static charge that made it difficult to handle the sheet, (3) overcoming mechanical folding problems (the film is only half the thickness of the outer wrap), (4) preventing film to suction-bond to metal surfaces after wrapping, and (5) making the cheese slabs more uniform in size.

The search for solutions to these problems became a project of Tillamook and Package Machinery engineers.

Here's how the five hurdles were cleared: A plate-type chain-conveyor was installed to carry the naked cheese to the wrapping station. Static charge was overcome with an air blower and other devices, which effectively increased the rigidity of the film. Polished hard maplewood was used to enable the wrapped slabs to slide easier.

Correct sizing of the slabs was more difficult. It was necessary to change the dimensions of the wooden boxes (some 30,000) in which the cheese blocks are formed and cured. And an improved method was devised for cutting the slabs to uniform sizes with a butter cutter.

One sizing problem still remained. Blocks of cheese had an imperceptible "flow", which distorted them soon after they were removed from boxes. This was checked by stripping the film and waxed paper from the blocks of cheese immediately before cutting them into slabs, which were then properly fed into the wrapping machines.

Meanwhile, Tillamook engineers made changes to aid the packaging operation. They improved forming of cheese in the 20-lb. boxes; installed a pneumatically-operated, case-sealing pressure tube; enhanced the design of the shipping case; and controlled "oiling out" of cheese during warm-room treatment.

Fourth step—With these problems solved, a second FA wrapping machine was installed to apply the inner wrap. It was hooked up to the original machine by a maplewood conveyor to facilitate sliding of the wrapped slabs. Maplewood guard rails also prevent the unsealed film from unwrapping from the cheese slab.

At the transfer point on this conveyor, an operator carefully feeds these Pliofilm-wrapped slabs to the second wrapping unit, which applies 300-gage cellophane.

Curds are formed in a rectangular Wilson-type hoop. This new cheese is first hand-wrapped and then transferred to boxes the next morning. The filled boxes are then moved to the curing room.

Enough boxes for a day's run are moved from curing to an 80-deg.-F. room. Increasing the temperature of the cheese at this point makes it easier to cut the block into slabs.

Blocks of cheese are removed from boxes, stripped of wraps, and cut into the ½-lb. or 1-lb. slabs. These are immediately fed into the first wrapping machine, where the 40-gage tensilized wrap is applied. Wrapped slabs discharge from this unit onto a conveyor going to the transfer point. Here, an operator feeds them into the second machine and the outer wrap is applied.

Special Shipping Case

Wrapped slabs are arranged in proper quantity and form to fit into shipping cases. A five-panel inner cover is placed over the lot, and then the corrugated case goes over it. Next, the filled case is turned right-side up and a top corrugated liner is placed over the cheese. Glue is applied to the flaps and the case is transferred into the pressure tube. Here, a pneumatically operated ram moves it through the tube to complete the seal.

Cases are palletized and again moved into the warm room, where a slight oiling-out occurs. This creates further bonding of inner wrap to the cheese to retard mold.

Both machines now wrap 80 slabs of cheese a minute. Higher speeds are possible with more uniform slabs.

Studies showed that a girl had to wrap at least four packages a minute to be acceptable for the job.

Packaging Special

IT TAKES THREE to set up specifications for buying packaging units. For since the purchasing agent is not familiar with equipment requirements he must get help from heads of the engineering and production departments.

To Make Certain of New Machine Performance—

Spell It Out in "Specs"

Only in that way will you be assured of getting what you intended to buy. And here, point-by-point, are the details which your order should cover

CHARLES O. SMITH
Industrial Engineer, Hiram Walker & Sons, Inc., Peoria, Ill.

LET'S ASSUME that the purchase of equipment has been justified and management's approval has been obtained.

You are now faced with the job of getting equipment to do exactly what's required.

If you fail, all previous planning will be fruitless.

Usually, failure to obtain a machine measuring up to desired performance is attributed to misunderstandings between purchaser and equipment manufacturer. And the only way to avoid these misunderstandings is to include adequate written specifications with a purchase contract.

This then raises three questions:

1. **What is to be gained by writing the specifications?**
2. **Who is to write them?**
3. **What should be included in them?**

Take the first question:

By writing specifications, the purchaser definitely knows what he's to get. What's more, he'll be assured that the equipment will operate in the required manner.

On the other hand, the manufacturer will know what equipment to furnish and what it's expected to do.

Specifications also will eliminate the confusion that commonly attends verbal agreements. Further, time-wasting conversations will be avoided, as well as volumes of correspondence between purchaser and equipment manufacturer.

This now brings us to the second question:

Rarely is the purchasing agent familiar with technical and production requirements of equipment. To write specifications for packaging equipment, it is usually necessary for him to obtain the assistance of representatives from the engineering and production departments.

They will aid him in negotiating certain difficult sections of the specifications with the manufacturer. These negotiations must be completed to obtain full benefits from specifications.

As for the third question, the following list has been

Packaging Special

Typical Guide–Covers All Aspects

PACKAGING MACHINE CHECKLIST

Guide for Setting Up Specifications

1. PHYSICAL DETAILS
   - A. Name and model
   - B. Right- or left-hand operation
   - C. Materials of construction
     - Regular or special for contact or wearing surfaces, pumps, piping, valves, and gaskets.
   - D. Electrical requirements
     - Voltage
     - Underwriters classification
     - Motors—manufacturer and capacity
     - Starters—manufacturer, capacity, and location
     - Switches — manufacturer, capacity, and location
   - E. Lubrication requirements
     - Fittings—at point of use and central location
     - One-shot system
   - F. Safety features
   - G. Paint—type and colors
   - H. Special items, as shrouding
   - I. Auxiliary equipment and miscellaneous items
     - Variable-speed drives — speed range
     - Pumps—pressure, capacity, and type
     - Vacuum pumps—vacuum, capacity, and type
     - Clutches
     - Heaters
     - Counters
     - Indicators
     - Micro-switches
     - Electronic controls
     - Timing dials
2. CHANGE PARTS
   - A. Quantity required, individual parts, or sets
   - B. Marking
   - C. Interchangeability
   - D. Time required to change over
   - E. On delivered equipment
   - F. Shipped separately
3. ENGINEERING DATA AND DETAILS FOR INSTALLATION AND INTERCONNECTING
   - A. Equipment — floor plan, elevation view, assembled weight, and floor loading
   - B. Details of interconnection
   - C. Limiting factors effecting installation—heights and width of doorways and halls, elevator capacities, and floor loads
4. OPERATING DETAILS AND GUARANTEE
   - A. Description of job expected
   - B. Speed of operation
   - C. Tolerances allowable
   - D. Efficiency expected—defined as to speed, period of time, and acceptable quality
   - E. Packaging materials to be used on equipment — specifications and samples
   - F. Materials to be packaged — special precautions
   - G. Operators—number required, skill, and sex
5. INSPECTION AND TEST AT MACHINE MANUFACTURER'S PLANT (Using packaging materials and product to be handled)
6. DELIVERY, INSTALLATION, AND TEST PERIOD
   - A. Delivery date
   - B. Method of shipment—rail (knocked down on skid) or truck (assembled and crated)
   - C. Movement into position and uncrating
   - D. Installation — supervised by manufacturer's engineer (labor and materials supplied by purchaser)
   - E. Start up—supervised by manufacturer's engineer
   - F. Instruction and demonstration for operators and mechanics by manufacturer's engineer
   - G. Test period—time in which guarantee is to be met, supervision of manufacturer's engineer, and cover change parts, or special agreement
7. MANUALS AND DATA
   - A. Operating manual — illustrated instructions for specific model, with changeover details
   - B. Parts manual — illustrated instructions for changing parts on specific model (parts stocked by manufacturer)
   - C. Wiring diagrams
   - D. Lubrication manual
   - E. Data for timing charts
8. GUARANTEES BY MANUFACTURER AGAINST —
   - A. Poor workmanship
   - B. Defective materials
   - C. Patent claims

set up to serve as a guide in preparing specifications. Presented in logical order, it comprises eight sections.

Section 1 covers physical details of the equipment and calls for this procedure:

Name fully the name and model, whether the equipment operates right- or left-handed.

Specify types of construction materials. They may be the usual materials that the equipment maker covers in his brochures. Or, special materials may be needed for such parts as contact or wearing surfaces, pumps, pipes, valves, and gaskets.

Give the electrical requirements. Include voltage and the underwriter's classification. Declare the capacity and the manufacturer of motors. Also, state the capacity, manufacturer, and location of switches and starters.

Include the location of lubrication fittings, whether at a central spot or at point of application. Make it known if a one-shot lubrication system is desired. Learn if special greases must be used.

Incorporate all safety measures necessary to meet state, local, and plant requirements. Insist on additional safety devices, if needed.

Name the type of painting and colors to be used on equipment. Definitely include special items, such as shrouding.

Itemize all auxiliary and miscellaneous items to be included with the equipment. These may comprise pumps, heaters, clutches, counters, timing dials, microswitches, electronic controls, and variable speed drives.

Go into as much detail on this section as possible. For the more care you take, the more likely will the equipment operate in the desired manner.

Section 2 includes change parts necessary to provide the machine with the required flexibility.

State here the number of individual parts or sets of parts, which should be plainly marked and interchangeable on all machines of the same model.

Specify what parts are to be shipped separately or installed on the machine prior to delivery.

Also include here the time required to change the equipment—switching from one set of change parts to another. This changeover time should be that required using regular labor rather than that of the equipment maker's skilled mechanics.

Section 3 concerns engineering data and details on installation and interconnection of equipment on the processing line.

First request elevation and floor plans of the equipment, as well as the floor load and assembled weight of the machine.

All information on the interconnection of equipment into the processing line should be worked out between the engineering department and the machine manufacturer. Fully investigate all factors possibly limiting the shipment of the equipment. These cover height and width of doorways, elevator capacities, and floor loads along the route the machine must travel to reach its final location. Failure to make thorough investigation of these points may cause untold difficulties.

Section 4 refers to operational details and guarantees on the equipment. This is a very important section in the purchasing specifications and it must be completed in detail.

Exactly describe the job the equipment is to perform, giving the expected speed and allowable tolerances.

Specify efficiency expected to be attained. And define this efficiency on the basis of speed, period of time for which it is to be calculated, and the acceptable product-quality allowable during this efficiency check.

Furnish the equipment maker with samples of packaging materials that are to be run on the machine. And also let him have samples of the materials to be packaged. In addition, call his attention to any special precautions that must be taken in handling these materials.

State the number, skill, and sex of the operators required to run the unit. This does not mean that the equipment maker must advise you on employing male or female help. However, it is always best to have a definite understanding on the type of help needed.

This section will enable you to obtain performance guarantees, and the details should be carefully negotiated. Specifically state time limits for the fulfillment of these guarantees.

The guarantees should not be "held over the head" of the equipment maker. However, it is necessary to have a complete understanding to protect both parties.

Section 5 covers inspection and testing of the machine at the manufacturer's plant. If possible, the tests should be carried out with the materials that the machine is to handle at the food processor's plant.

Section 6 includes details on delivery, installation, and the test period.

Specify the date the equipment is to be delivered. It should be the responsibility of the manufacturer to notify the purchaser of any change in this date.

Advise how the equipment is to be shipped—whether by rail or truck. Also mention if it is to be skidded or crated and skidded.

Make certain who is to be responsible for the shipment—from the rail- or truck-receiving point to the final location on the line—and who is to handle the uncrating.

Let it be clear that the installation and initial operation of the equipment is to be under the supervision of the manufacturer's engineer. Labor and materials should be supplied by the purchaser.

The maker's engineer should also be responsible for demonstrating and instructing operators and mechanics on the operation of the equipment. And the machine should run properly before he leaves the plant.

State here that the test period should run to termination under the supervision of the maker's engineer, or until the guarantee has been fulfilled. During this period, all change parts should be tested, if possible. Otherwise, cover yourself by a special agreement with the manufacturer.

Section 7 deals with manuals and data to be furnished by the manufacturer.

An operating manual should cover the specific model. It should be illustrated and include operating and changeover instructions. And it should also be written in nontechnical, easy-to-understand language.

Similarly, another manual should pertain to the parts employed on the specific model. This should include change parts to be supplied and exploded photos of assemblies. And all regularly stocked parts should be indicated.

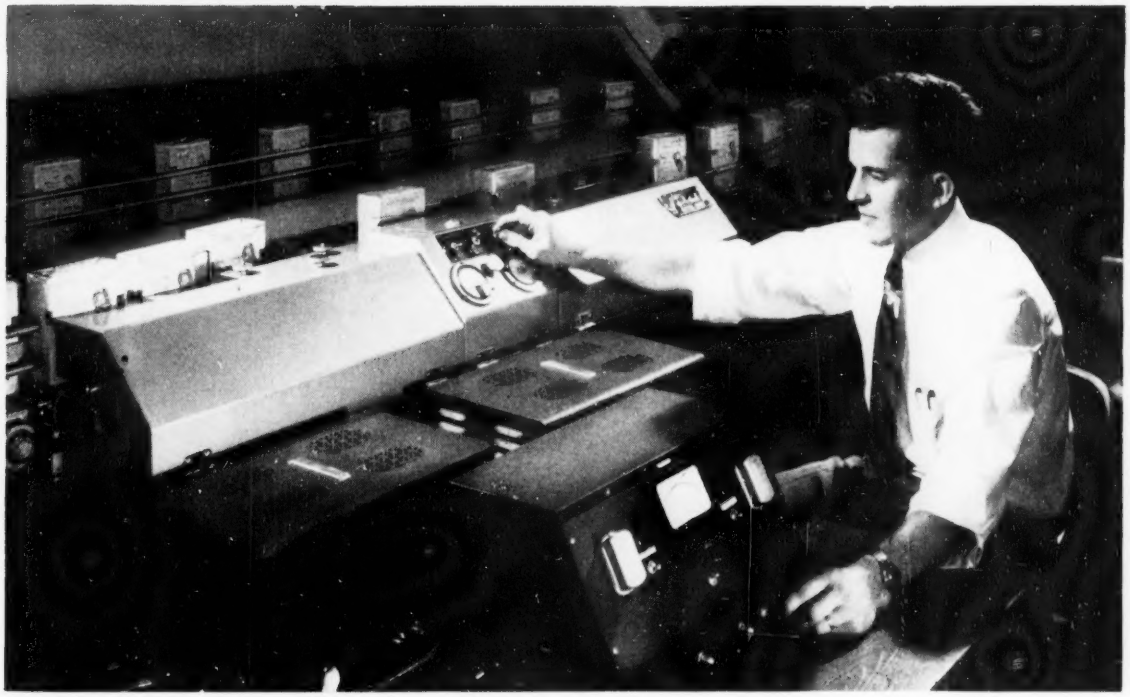
Ask for a lubrication manual and wiring diagrams. These diagrams are especially necessary for equipment with electronic controls.

Request data for making out timing charts to be used in connection with timing dials.

Incidentally, these manuals should be set up so that they can be kept up to date. Often you will want to make changes in the operating instructions.

Section 8 includes three points that are normally covered in purchase contracts—guarantees by the maker against poor workmanship, defective materials, and patent claims on the equipment to be purchased.

The above article was based on a paper presented at the recent 14th Forum of the Packaging Institute, held in New York City.



ELECTRONIC check-weigher on high-speed packaging line is teamed with electronic computer and servo-mechanism to automatically adjust filling machine and save on overfills. New system reduces labor costs by eliminating manual check-weighers and manual adjustment of filling machine. It check-weighs 90 packages per minute.

Processors Size Up Problems and Find

What It Takes To Cut Costs

Fast and accurate filling is termed No. 1 for attaining $-saving progress. Quick changeover and easy adjustment to reduce downtime also gets sharp attention. And many other moves get spotlight . . .

SAVINGS on packaging lines—no matter how small—can't be ignored. Higher costs for products, packaging materials, and equipment, together with climbing labor rates and expensive fringe benefits—make this imperative.

Product saved by more accurate control of weighing and filling can conserve thousands of dollars within a year.

The saving of a fraction of an inch on packaging materials can mount to a sizable figure when multiplied by the number of packages turned out in a year.

Minutes saved in the change-over of equipment may reduce overtime wages paid to the mechanical force. Checking causes for downtime will "up" output. And adequate specifications for packaging materials will assure better machine performance.

Labor and materials saved by curbing defective machine operations will cut packaging costs. Poor capping, sloppy labeling, faulty sealing or tucking of cartons, loose outer wrapping, and improper case gluing and sealing cannot be afforded.

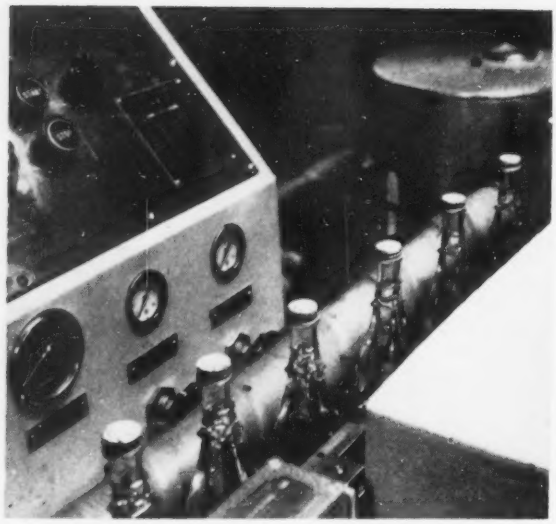
To attain maximum savings, five steps are called for: (1) Select fast and efficient machines, (2) maintain them in apple-pie order, (3) make certain they do not incur excessive changeover time, (4) choose machines to eliminate manual tasks, and (5) prepare adequate specifications for packaging materials.

Some of the Needs

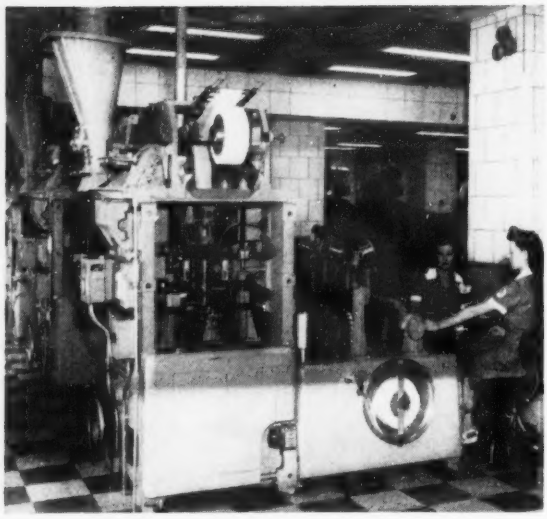
What are food processors looking for to help them effect these cost-cutting steps? And what are they doing to their packaging lines to assure success?

Certainly, they are not seeking hazy miracles. The targets are specific. They want improvements in the design and construction of machines for higher speeds, ease of adjustability, and accessibility of parts for cleaning and maintenance. And they want these machines to operate within less space and at maximum efficiency. Examples—

One processor wants a machine for more precise, volumetric pre-measuring of a liquid product prior to filling it into bottles.



THERMOPLASTIC labeler operates at 300-per-min. speed. Users report savings in labor and floor space.



THIS SPEEDY wrap-around labeler handles 500 cans or jars per minute in a variety of sizes.

While pre-measuring fillers are desirable for bottling costly liquids, they usually are slow-operating machines and not easily adjustable from one size to another.

However, a relatively new 30-pocket, pre-measuring type filler has estimated, 650- and 550-per-min. speeds for 5- and 8-oz. jars of baby food, respectively. Reported accuracy of this plunger-type filler is plus or minus 0.6 percent for 8-oz. jars.

Vacuum and gravity fillers operate at high speeds. Since they fill to a line on the container, inaccuracies in fill are likely to occur due to possible variations in the capacity of the containers.

It therefore becomes a matter of economics—a choice between over-filling at high speeds, or controlled, accurate filling at slow speeds.

Other processors are impressed with machines that perform several operations simultaneously—such as filling, closing, labeling or coding, and sealing cartons. Such machines are space- and labor-savers, and the initial investment usually is less than that for two machines.

Self-Adjusting Fillers

Still others seek an automatic filler adjuster. Such a system, one packer believes, might consist of two weighing devices hooked up with an "electronic memory." Cartons might be automatically weighed empty and then full, and any differences between gross and tail weights—beyond a pre-set range—could actuate a servo-mechanism to make the necessary corrections on the filler. An electronic filler adjuster that check-weighs each filled package and operates on statistical-control principles has been developed (FE May '51 p. 55). And it is in operation in one food plant.

Variations in the density of products pose the need for continuous, automatic adjusting of volumetric fillers. Manual adjustment usually is inefficient. By the time a change is made for one lot, another with different density may be running through the machine. And before a correction can be made, many cases with over- or under-weight packages will be put through.

Recently, temperature controllers and recorders were installed on a packer's lines feeding positive-displacement, multi-pocket, rotary-type fillers to prevent temperature, fluctuations of liquids and corresponding volume-fill changes. What's more, pocket-to-pocket variations now are overcome by a single adjustment. By loosening and then tightening a screw, a cam ring can be easily raised or lowered to adjust the fill of each pocket uniformly.

Said one processor: "There's a definite need for higher speeds on multihead net-weighing machines. "About 40 yr. ago, rated capacity on a carton-forming-filling line, for example, was approximately 30 per min. Speeds increased to about 60 per min. some 20 yr. ago—and here they've remained."

Bag forming filling and sealing machines, however, recently have hit speeds of 100 to 120 a minute.

Want Faster Automatic Machines

"Labor costs are getting out of hand in our plant," said one bottler. "Naturally, we are interested in fully automatic machines that require fewer workers who operate with higher productivity. For example, before the war we employed a man on each labeling machine. Today, one man operates six labelers on a single, higher capacity line. Also, we want faster machines to eliminate our second shift."

From a Packer came this statement:

"We like to see more machines like the roll-through or wrap-around labeler that handles over 600 round cans or jars per minute. This high-speed machine has few moving parts and it's easy to maintain."

Finding new favor are the high-speed (330 per min.) thermoplastic labelers. These units, devoid of reciprocating parts, handle as many as four sizes without change parts.

Still another firm pointed to the significance in the growing trend to automatic machines. To attain greater efficiency, such machines—and not the operators—set the production pace. Operators merely make simple adjustments, clear a line of jam-ups, and periodically feed packaging materials to the machines. And they check operations for improper filling, capping, labeling, coding, carton-flap tucking, and wrapping.

Incidentally, this company feels that many firms will eliminate the expensive second shift. Surveys revealed that this shift is 15 to 20 percent less efficient. Also, second-shift workers usually get 5 to 10¢ an hour more.

This processor also is achieving greater efficiency by keeping down his inventories in an effort to reduce handlings, labor costs, and warehouse space.

By scheduling orders and shifting workers to different

lines (each with permanently adjusted machines), many different package sizes and products are turned out on one shift. And these items are loaded directly into trailer-trucks, instead of being stacked in a warehouse for re-handling.

Formerly, one package size or product was run on each 8-hr. shift, and other sizes or products on subsequent shifts. As a result, huge inventories were built up.

Sanitation Stressed

One quality-minded processor wants more emphasis on sanitary features of equipment construction. He believes that non-corrodible material should be employed for certain parts in contact with products. Hopper surfaces should be smooth and without dirt-catching corners.

Machines should be readily accessible for cleaning, and parts must be easily dismantled with simple tools. Internal threads, dead-ends and pockets, and porous materials must be avoided in certain cases.

Processors operating filling lines for mayonnaise, ketchup, jellies, jams, peanut butter, and similar viscous products, also are seeking machines that can be readily washed. Here, container breakage and product spillage require frequent washing of machines. And they must be designed so that wash water will not raise havoc with electrical apparatus, glue pots, wipers, and hold-down pads on labelers.

Newer Uses for Thermoplastics

Need for faster carton-sealing was stressed by a packer, who believes that it might be accomplished by development of a special heat-sealing technique whereby carton flaps are coated with a thermoplastic resin and then automatically heat-sealed.

Possibility of replacing glues with thermoplastics for more rapid sealing of cartons and shipping containers may be remote. Big stumbling block is cost. Of course, the cost of thermoplastics will drop as their use increases.

Certain questions, however, must be answered first: Will this new sealing technique be more efficient? Can thermoplastic resins be spot-applied to flaps in an effort to use less of these materials effectively? Would the additional cost for electricity needed for heat-sealing be out of line? Or would a shorter, space-saving compression unit offset this additional cost?

Packaging Special

Chief kernel of want in some plants is the high-speed machine to fit a limited space. Processors are licking this problem in various ways.

Packaging lines in some instances are being arranged in an L- or U-shape. The answer in other cases is a taller, rather than longer machine that performs several simultaneous operations—such as forming, filling, and sealing bags—in vertical sequence.

Further, some plants—where headroom is spacious—have hit upon the idea that there is *more than one level of operation*. They have built mezzanines and installed machines for forming and feeding cartons to packaging lines below.

One firm is even employing automatic case gluers and sealers as elevating conveyors for feeding cased goods directly to an adjacent warehouse. Still another firm employs suspended casing machines that require little maintenance. Glue is pumped to the machines as needed.

Recent development of a close-coupled bottling line has solved the space problem in a plant supplying flavor extracts. New feature is combining of the rotary filler and capper on one base. And both units, plus the bottle cleaner, operate from a common drive.

Containers discharged from the cleaner are transferred directly into the pockets of the filler's intake spider. Filler's discharge spider then serves as the intake spider of the capper. Ample clearance in the pockets of the feed and transfer spiders permits handling of misshapen jars.

Faster Fruit Packaging

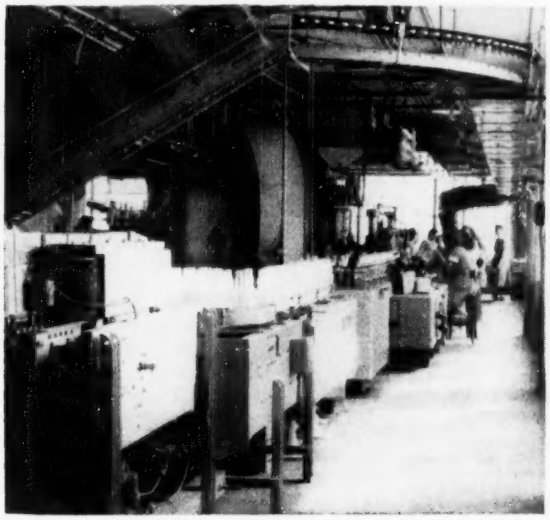
Using a new method of packaging dried fruits, packers now can realize substantial savings in labor and floor space. And they can attain an increase in output to boot.

Employed is an automatic line requiring only two workers who turn out 45 to 50 packages per minute. Fruits are conveyed to a machine that forms the bag from roll stock, fills it from a net-weight scale feed, and seals it.

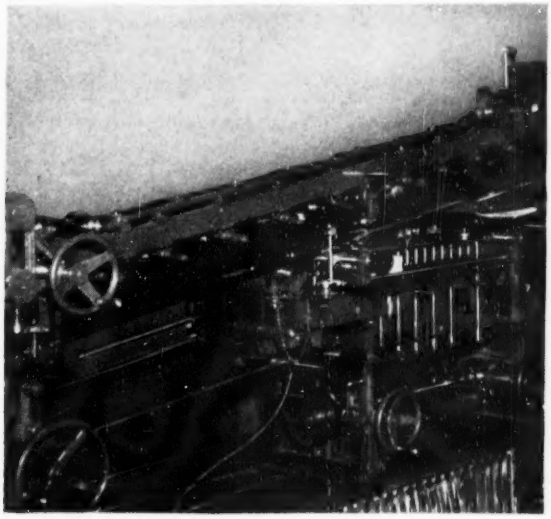
In comparison, average production on the semi-automatic line is 40 packages per min. with 14 men.

The same automatic machine is to be used for handling the entire output of pretzels and vanilla wafers coming directly from a band oven. Here, savings in floor space, labor, and packaging materials will be significant.

(*Turn to page 125*)

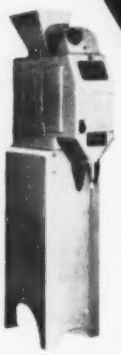


USING a close-coupled line, less space is now taken up by high-speed packaging machines in bottling plants.

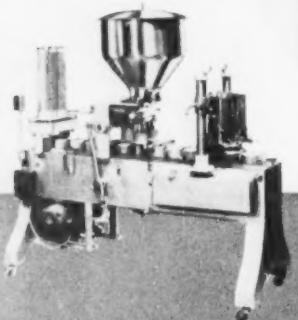


BATTERY of space-saving machines performs multiple operations—heat-sealing tea bags and applying tags.

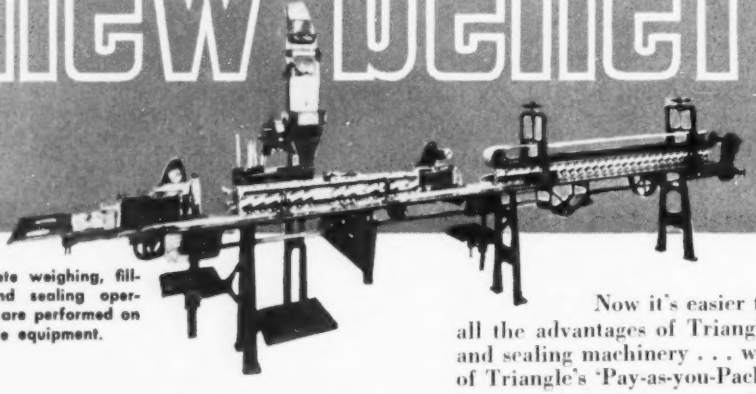
Now . . . Triangle's 'pay-as-you-package' plan BRINGS YOU new benefits



Triangle offers a complete line of weighing and filling equipment — such as the Triangle Elec-Tri-Pak.



The Triangle-Bagby line includes filling equipment for dairy and other semi-liquid food products.



Complete weighing, filling and sealing operations are performed on Triangle equipment.

If you're wondering,
"When should I buy new packaging machinery?"
. . . read this . . .

Now it's easier than ever to obtain all the advantages of Triangle weighing, filling and sealing machinery . . . with the added help of Triangle's 'Pay-as-you-Package' Plan.

In many cases, just a part of the savings earned with new Triangle equipment covers its cost. Manpower and time savings quickly recover your investment . . . and quickly show substantial new profits for you.

There's a Triangle or Triangle-Bagby machine to meet your exact requirements . . . to fill all dry and semi-liquid food, bakery and dairy products.

It costs nothing to get all the facts . . . and there's no obligation.

See us in Booth 412 at the Packaging Exposition, Navy Pier, Chicago, April 20-23

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Sales Offices: New York, Newark, Baltimore, Boston, Atlanta, Dallas, Denver, Los Angeles, Portland, Ore., Montreal, Mexico City

SHUT-DOWN TIME for clearing damaged cartons from Package Machinery's new 160-per-min. frozen-food wrapper is now considerably reduced with this convenient "lift-up" overhead transport-chain assembly (arrow). This specially designed counterbalanced assembly requires little effort to expose folding mechanism for wrappers.

Equipment Makers Aid Cost Reduction Through

Innovations in Machines

Significant improvements—both big and little—are marking the trend to better built-in performance. We present them here in four major categories:

1. Outstanding Equipment Developments
2. Special Devices That Curb Production Delays
3. Better Construction to Improve Machine Performance
4. Sure, Easy Lubrication to Reduce Maintenance

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

TODAY, the trend is toward the development of higher-speed packaging machines designed to operate with less delay and downtime.

Developments are also directed toward more accurate weighing and filling machines, as well as equipment that requires a minimum amount of maintenance.

Attending these strides are a great number of innovations to gear machines for better production-line performance.

New materials are going into the units to make them operate more smoothly. More automatic equipment requiring less attention is appearing. New features are being incorporated for easy adjustment. Small assembly units are being provided to increase machine flexibility.

More machines are being built with automatic and semi-automatic lubricators. Maintenance chores are being reduced. Safety and sanitary features are being included.

The parade of improvements is never ending.

1—OUTSTANDING EQUIPMENT DEVELOPMENTS

Take the dairy field. Here, automatic case packers for fresh milk have been developed, with successful commercial use in the offing. A milk-bottle uncaser is in operation, and both uncasers and casers are cutting costs in beverage plants.

Another innovation is an automatic bundler for 5- and 10-lb. bags of flour, sugar, and similar items. This unit

Satisfaction rests on the carton

Along with more than half of the major users of shipping containers who maintain their own package testing laboratories, General Mills, Inc. uses UNION Corrugated Containers. Choose your shipping container well. It is the guardian of your good name.

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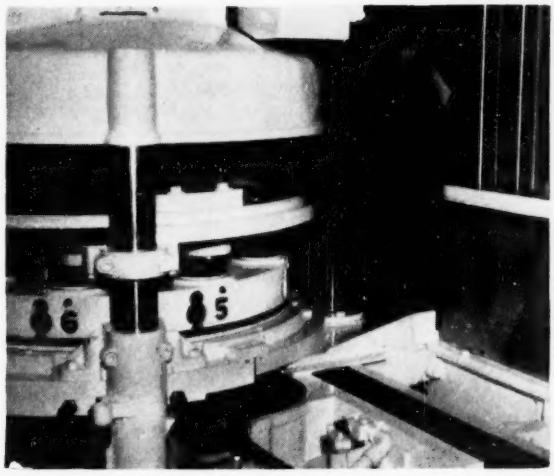
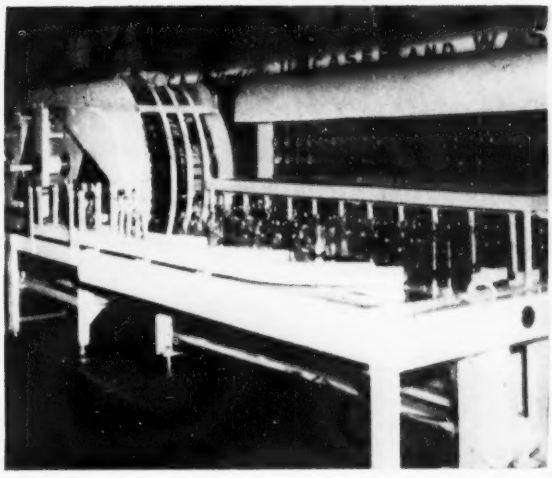


NEW ASEPTIC can closer handles up to 650 containers per min. Machine has only a tenth as many parts and weighs but a fourth as much as conventional equipment.



UNCASER and washer-loader was recently developed by RCA to remove milk bottles from cases by inverting and setting them up on belt to washer. Rate: 24 cases a min.

loads six 10-lb. or twelve 5-lb. bags into a paper bag, which is then glued, folded, and sealed. This bag is cheaper than cartons and saves in shipping weight.

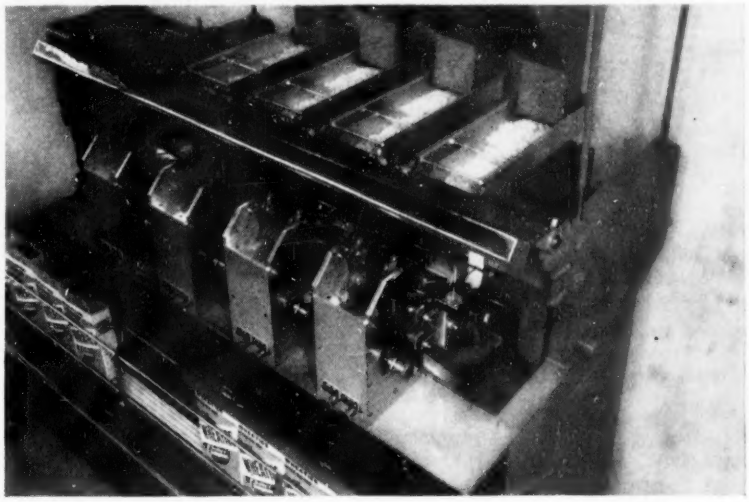
Speedy, precise carton filling now is being achieved with a new straight-line, multi-head net weigher (FE, Mar. cover picture and article, p. 62). Employed is a principle of sensing minute movement of a "scale" beam toward an air jet. Back pressure builds up in the air line as the air gap narrows, and this operates an air relay to actuate the netweight filler mechanism.

About 140 cartons a minute is the fast top speed for a single-stream fed, four-head machine. Indicative of the unusual precision are these performance data: Weight variations for 99 percent of packages on a test run ranged from a $\frac{3}{32}$-oz. low for sugar (2-lb. units) to a $\frac{5}{32}$-oz. high for bran flakes (12-oz. units).

An X-ray unit checks height of fill of liquids or free-flowing solids. Speed: 800-900 containers per minute.

Accented along with speed and efficiency is simplicity in the new machine designs. For instance, a new aseptic can closer is said to have only one-tenth as many parts, and to weigh but one-fourth as much, as conventional equipment. This machine is designed to handle up to 650 cans of the 202x404 size per minute.

As a can enters the machine, a lid is applied and the can moves into a pocket in a large rotor. A spring-loaded revolving chuck presses down on the lid and rotates the can as the edge of the lid and the lip of the can travel together through a gradually narrowing groove in a semi-circular seaming bar. Partially formed in this first seaming bar, the seam is completed during continuous travel of the can in a second semi-circular bar. This seamer has eight heads, or chucks, driven by fiber gears that turn against a fixed ring gear as the rotors revolve.



SPEEDY, precise carton filling is attained with this four-head, pneumatic-weigh unit. It scales 80 packages of Wheaties per min., with $\frac{1}{8}$-oz. overfill saving.

The simplicity of design contributes to easier maintenance and adjustability. And the machine takes relatively little floor space.

Other examples of a simplicity achieved through new operating principles are beverage bottle uncasers and casers with continuous-travel, chain-mounted pick-up fingers that gently raise or lower bottles from or into cases as the latter are lowered or raised in continuous travel on an inclined conveyor belt.

In a different form, this easy pick-up of bottles during continuous travel is employed in a milk-bottle uncaser. The machine inverts the cases over large, revolving transfer wheels with pliable rubber gripping surfaces. As they turn, these wheels gently deposit the bottles right-side up on conveyor belts that supply the washer feed (FE, June '52, p. 127).

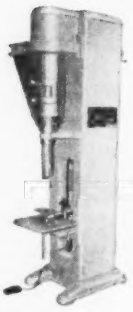
Multiple-Operating Machines

As packaging costs inch upward, the trend is also toward machines performing multiple operations. Some are now available; others will be developed.

Typical of what is now offered are machines that: (1) Fill and label bottles; (2) feed, form, fill, and seal pouches or small-sized cartons; (3) form a lined package from a cut-and-scored carton blank and an inner liner

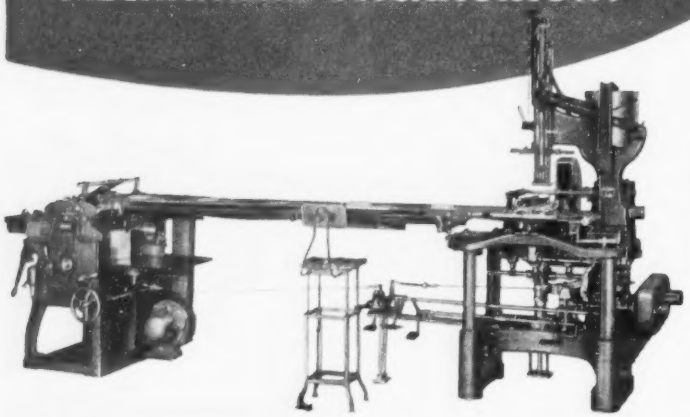
Packaging Special

Improved Dexterity in MECHANIZED PACKAGING...



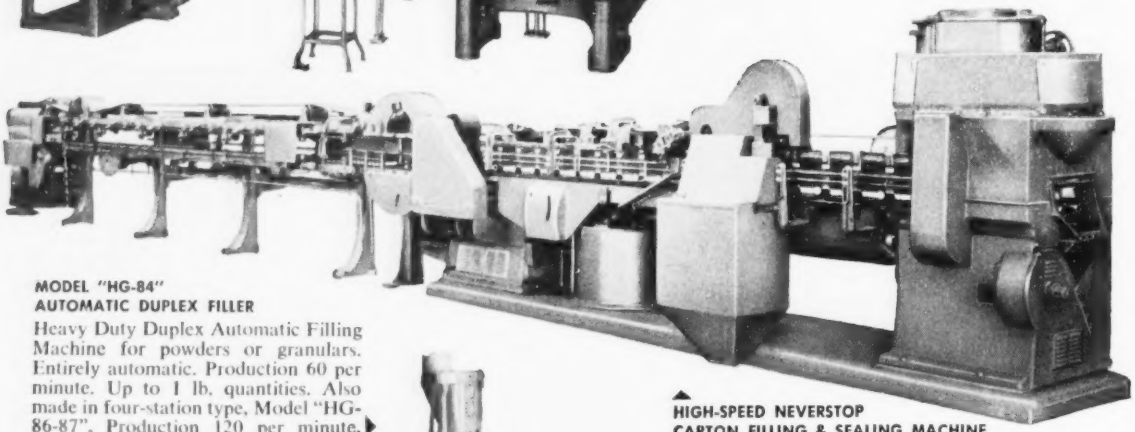
MODEL "EG" UNIVERSAL FILLER

Newest design. Fully streamlined. Fills by gross weight or by packing or by measurement. Handles powders, granulars or pastes. Various types of containers. ¼ oz. up to 5 lbs. or more. Production 15 to 30 per minute.



STOKESFEED PAPER BOX MACHINE

A complete paper box gluing, feeding and wrapping unit. Made in two sizes—Model "B" and Model "H". Completes up to 40 boxes per minute. Only one operator required. MODEL "B"—maximum: 20" x 15" x 4"; minimum: 6" x 4" x ½". Model "H"—maximum: 15" x 10" x 2¾"; minimum: 4" x 1¾" x ½".

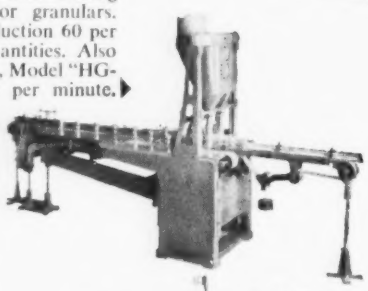


MODEL "HG-84" AUTOMATIC DUPLEX FILLER

Heavy Duty Duplex Automatic Filling Machine for powders or granulars. Entirely automatic. Production 60 per minute. Up to 1 lb. quantities. Also made in four-station type, Model "HG-86-87". Production 120 per minute.

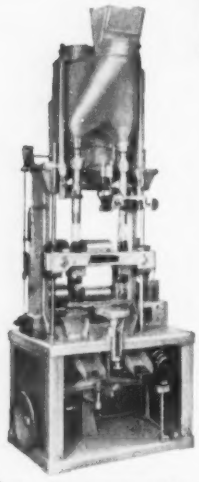
HIGH-SPEED NEVERSTOP CARTON FILLING & SEALING MACHINE

For free-flowing products. Feeds, fills and seals cartons, both top and bottom, in one continuous operation. Cartons 5 1/16" x 3/16" x 1 3/16" to 8½" x 6" x 2⅛". 60 to 200 or more per minute. One operator.



AUTOMATIC STRETCHRAP PACKAGING MACHINE

For wrapping odd shapes of articles or pieces, smoked meats, sausage, toys, etc. with heat sealing "Pliofilm". One operator required. Production 12 to 15 per minute.



STOKESWRAP AUTOMATIC PACKAGING MACHINE

Equipped with auger feed. Forms, fills and heat-seals the package, taking printed or unprinted web from roll stock. Volume to 56 cubic inches or 1 lb. 50 to 120 packages per minute.

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fed from a roll; (4) produce tea bags with string and tag attached; (5) count ¼-lb. units of crackers, reject broken crackers, and overwrap; and (6) group packages and insert them into cartons or cases, or overwrap them to form a bundle.

Machines are being built adaptable for handling a number of different size containers and types of films for wrapping cartons, open boats, and flat objects or cardboard. Self-measuring paper feeds permit continuous wrapping of items of varying height. Some machines single- or double-wrap products. Others even insert a cardboard in the wrapping and apply easy-opening tape. An attachment is provided to cut and apply roll-fed printed labels to the wrapper. Another attachment prints the variety of product, price, and date on the labels.

Labelers now are available that easily and quickly can be changed over to handle a variety of containers —round, oval, square, flat, and paneled. Wipers are adjustable with cap screws, and label magazines with thumb screws. Feeding star wheels can be swiftly removed by merely lifting them off shafts. With all units directly in front of an operator, it is easy for unskilled workers to make quick adjustments.

Faster Filling Operations

Major emphasis will continue to be upon higher-speed lines and more accurate filling techniques.

Some firms are making a beeline from straightline to rotary-type powder-filling machines.

Regarding addition of filler heads to present net weighers, one equipment maker says: "Going from a six-head, 70-to-90-package-per-min. net-weighing unit to an eight-head straightline filler seems impractical. Such a machine not only would require more parts, but it also would be unwieldy and call for a heavier base. Still it would not match the 300-per-min. speed of a 24-head, rotary vacuum filler."

Filling, however, is not the bottleneck on beer-bottling lines. Here the limiting factor is the 32-wide 12-oz. bottle washer and soaker—the largest unit that can be shipped on a flat car.

Rated speed of a beer-bottling line consisting of a 60-spout rotary filler and six labelers, hooked up in tandem, is about 360 per min.—a tripling in bottling capacity in a little more than a decade. Prior to World War II, a 34-spout filler and two rotary labelers handled only 120 bottles per minute.

Maximum speed on a flat-top beer-can line is 510 to 515 per min. This line comprises a 60-spout rotary filler and a 6-spindle can sealer. Top speed of the filler is reported to be 600 cans per minute. And a manufacturer considers it possible to build an 80-spout filler that could handle 750 to 800 cans a minute.

600 Jars of Baby Food a Minute

Top speed on a baby food glass-packing line is 550 to 600 jars per min., depending upon the product. Employed are two pace-setters—a 21-head piston filler and a 16-double-spindle rotary cap sealer.

Possibility of increasing the number of heads on both machines to step up output is not remote.

For example, an equipment manufacturer now is contemplating the construction of a 35-station, rotary, piston-filling machine to handle 800 jars of baby food per minute. To economically utilize this high-speed filler, however, it will be necessary to review the entire production line. It may take new conveyors and casing machines, as well as other changes, to operate at such high speeds.

After all, 800 jars a minute is 13⅓ a second that must be accurately filled and transferred to and through the closing machine without spillage.

Machines for New Films

Newer films will require specially designed machines to handle them. Saran-coated cellophane, 70-gage Pliofilm, and certain other films, present a feeding problem. High-voltage static eliminators are being used in some cases. Studies are also underway to learn more on how to condition some of these films properly.

Machine adjustments—in switching from one size closure or container to another, or from product to product—will be greatly simplified. In many cases, it will be necessary only to spin handwheels, pull levers, loosen screws, turn dials, or slide parts into slots.

Completely assembled units are being designed for each package size. When changing from one size to another, screws could be loosened so that one size unit would drop out and another one slide into position.

These individual units would take only a few minutes to replace and would insure accurate adjustments each time a change is made.

All working parts on fillers for free- and non-free flowing powders are being shrouded, particularly to prevent dust from causing wear of parts.

Some labeling machines, for instance, are now being shrouded—with hinged, removable doors for easy cleaning. As a further aid to simplifying maintenance, glue pots are sufficiently removed to prevent unnecessary deposition of adhesive on containers or principle operating parts. These pots are, however, accessible and visible for easy filling, and they are large enough to hold glue for up to a full day's run, depending upon the glue mileage.

Safe, rapid washing of bottling machines requires electrical units that are protected against water, dust, shock, and explosions. Motors and gear-reduction units should be totally enclosed and drip proof. Water-tight switches and water-resistant conduits are finding their place on liquid-handling packaging lines.

More rugged machines are being built to withstand rigors of sustained operations at top speeds. Additional devices—jam detectors, overload kick-outs, safety stops, and variable-speed drives—are preventing loss of materials, machine downtime, and damage to equipment.

2—SPECIAL DEVICES THAT CURB PRODUCTION DELAYS

Of great importance in curbing delays on packaging lines is the development of several special devices.

Let us take some specific examples, pointing out how each has assured greater production-line performance:

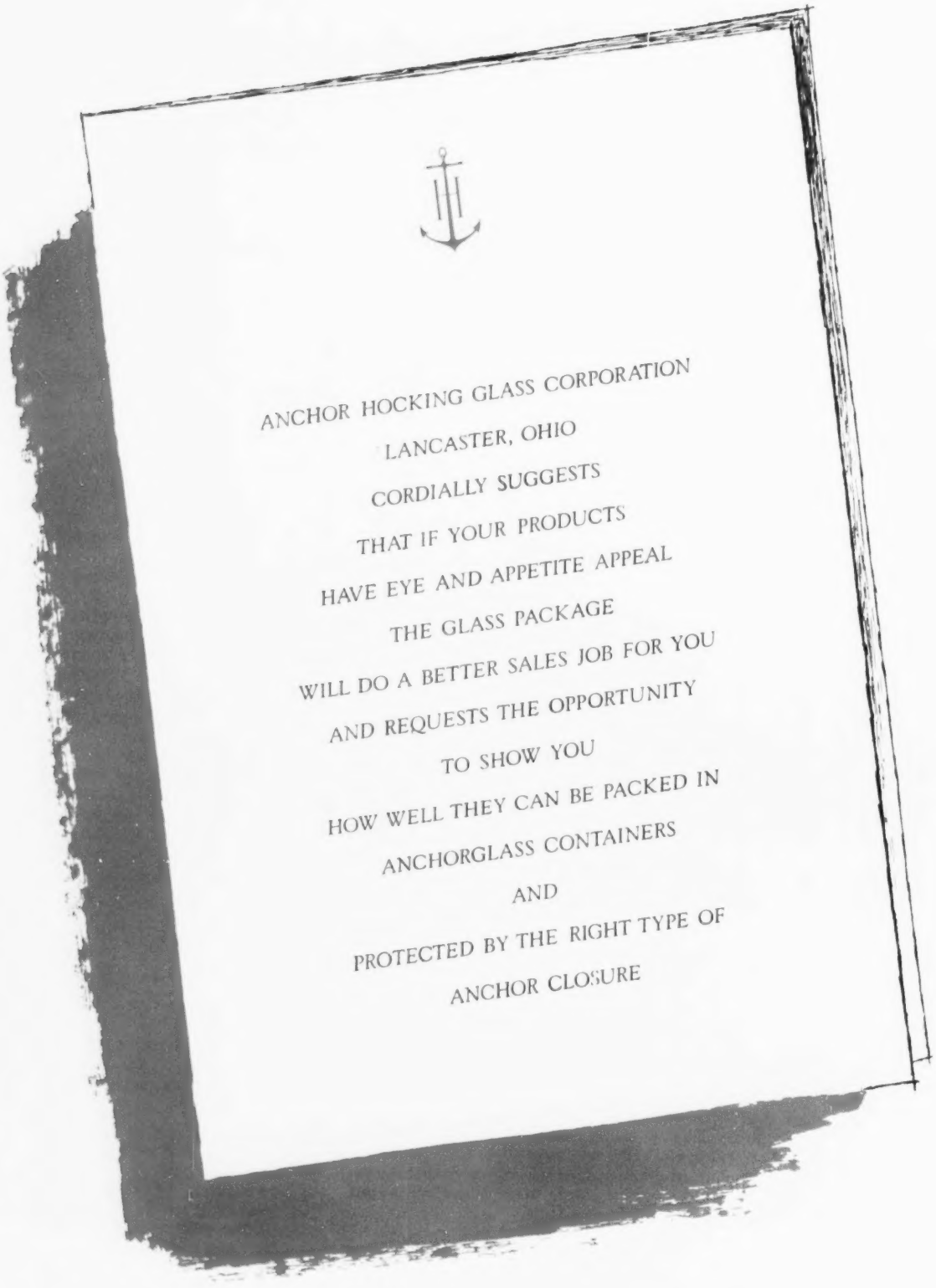
Heat controllers now are automatically adjusting the temperature of heat-sealing plates on wrapping machines, and thereby assuring proper sealing of films.

Faster setting of heat-sealed waxed-paper overwraps for frozen food cartons is now being achieved on shorter, water-cooled, compression lines.

In another case, solvent is wick-applied to cellophane to make a stronger, neater seal. Also, less heat-sealing is required.

Carton-filling of high-fat cake mixes had always been a problem, until an equipment manufacturer developed a specially designed cone-feed hopper for a two-scale weigher. Rotating vanes sweep the mix—with minimum agitation—into pipes located above the feed hoppers. In this way, a constant head of product is maintained to assure the uniform fills that are so essential for accurate weighings.

Smooth, steady, quiet flow of tapered jelly tumblers now is controlled on infeed conveyors so that they no longer telescope and fall. Installed is a



For more information, use coupon on page 213.

block chain between two flat-top belts. Speed of the block chain is synchronized with the labeler to prevent crowding of tumblers.

Steady, positive flow of round bottles to fillers is assured in some cases through the use of auger or screw-type feeders. These helical intakes pick up containers at random without the need of mechanical or safety devices like microswitches or timing fingers.

Within the past decade, output on beer-can lines has more than doubled—from about 240 to 510 of the 12-oz. cans a minute.

With the recent development of the six-can, carry-home carton, a new cartoning system had to be devised, handling 360 to 500 cans per minute. Adopted was a pair of magnetic star wheels and three specially designed dividers. The magnetic wheels split a row of cans into three lanes. Each lane continues to a divider that feeds two cans at a time into a carton. These infeed wheels were designed to assure a balanced load of cans into each carton, preventing jam-ups.

Infeed conveyor and multi-unit labelers arranged in tandem on bottling lines are equipped with variable-speed drives to assure flexibility and accurate control of bottles, whether their flow is steady or intermittent.

Also, a straight-line unscrambler with oscillating plates—synchronized with an infeed conveyor—marshalls bottles and feeds them evenly to separate lanes going to rotary labelers.

Infeed rate of bottles also is automatically controlled by a pressure-actuated pneumatic stop in the event of a jam-up. As pressure at the gate is reduced, these levers withdraw and infeed flow is resumed.

Labelers also are being equipped with "no-bottle no-label" and also "no-label no-bottle" safety devices.

Finding ways of getting faster production by additional applications of photo-electric eyes on wrapping machines is another good example. An electric eye-register-regulator scans over-wrap material as it is fed into the machine and "tells" the cutter-bar exactly when to cut off a sheet.

Recently, a two-way compensator was developed for accurately cutting sheets from printed, roll-fed film. This device assures proper alignment of the printed sheet over the carton. Employed is an electric eye, hooked up with a mechanical timer.

Jam-Up Safety Devices

Damage from jam-ups—a constant threat to efficient performance on packaging lines—now is being minimized by safety devices that stop the operation.

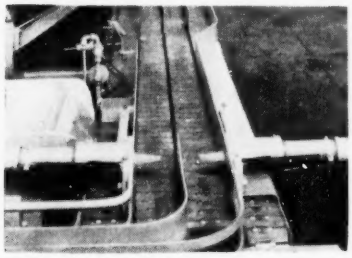
Overload safety clutches have been attached to drives to prevent damage to containers and machines. These clutches automatically kick-out and stop the machine whenever a predetermined load is reached.

On some labelers, a pneumatic gate is interconnected with a safety clutch to stop the machine automatically when bottles tip over or back up. Damage from jams due to odd-shaped containers also is avoided by this arrangement.

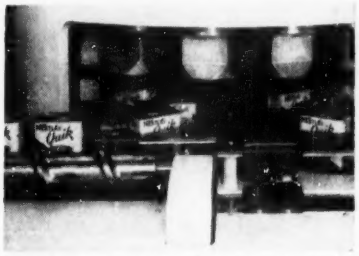
In another instance, a specially designed floating star wheel automatically lifts up on its shaft to stop further entry of bottles to the machine in the event of a jam-up. Stoppage of this unit has no effect upon the operation of the other equipment on the line. When the jam-up is cleared, the wheel falls into position and a correctly timed feed is then resumed.

Microswitches are widely used to stop packaging machines when a jam occurs—as well as to actuate machine operations. In point is the case of improperly opened shipping cartons. Too much pressure in the caser is apt to break a machine part. A pressure-operated switch will avoid such breakage.

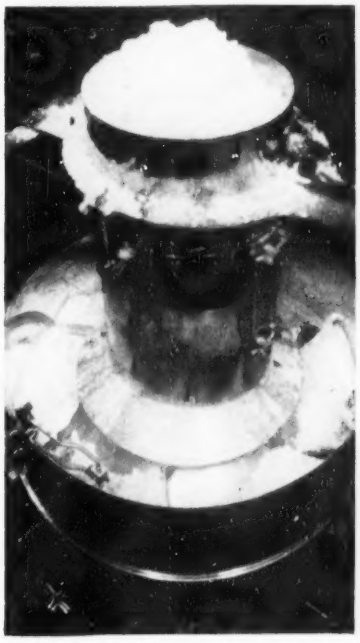
On bundling machines, microswitches control the flow of cartons to the collator to assure a correct number of packages in the group. And microswitches also control the feed of cartons to wrapping machines.



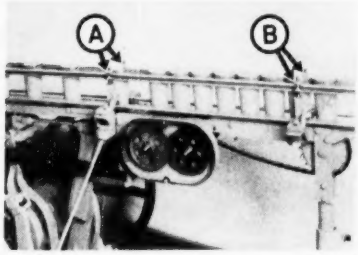
PNEUMATIC GATES (foreground) are interconnected with safety clutch to automatically stop conveyor whenever bottles going into Economic's tandem labelers back up.



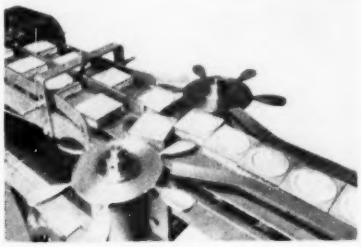
HELICAL INTAKE (left) is being increasingly used to assure positive flow of containers. It operates on this Pneumatic Scale rotary vacuum filler without safety devices.



THIS cone-feed hopper keeps constant head of product in Pneumatic's two-scale weigher. Rotating vanes sweep hard-to-handle, high-fat cake mixes into pipes above feed hoppers.



TIPPING OVER of jars is prevented by guide rails. Hand nuts (A & B) on rails permit height adjustments so caps ride above rails, bottom of jars are on conveyor.



SPECIAL dividers split single line of cartons into two lanes. Similar units on Standard-Knapp's six-can cartoner feeds two cans at a time into 6-can carry-home carton.

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3—BETTER CONSTRUCTION TO IMPROVE MACHINE PERFORMANCE

Where feasible, start-and-stop reciprocating parts are being replaced by faster rotary and continuous-motion straightline units. Reciprocating motion often is limited in speed and smoothness of performance.

Assymmetrical moving parts will be balanced for higher speeds. For instance, special cams operating the elevator lift for feeding cartons to the wrapping unit will be designed for speed.

Positive travel of cam follower and arm now is being attained by some re-designed cams. Net results are absence of lost motion in the operating mechanism and less wearing of parts.

One equipment firm "over-design" machines for greater strength, rigidity, and longer wear. Shaft sizes greatly exceed minimum requirements. And over-size bearings are employed to prevent need for replacement. Such heavy duty construction practically eliminates vibrations.

Machines with fewer, simply designed, easily accessible moving parts are being built. Notable are some machines that employ a multiple cam to operate several reciprocating parts efficiently.

Machine adjustments requiring only simple tools, and no micro-settings, are being designed. And guards for belt drives now are hinged for accessibility.

Also proposed, for easy assembly, are sealed, adjustable, self-lubricating bearings. Thus, one equipment firm believes it will end up with an economical, lighter, and yet more rugged machine, that can be turned out faster for custom delivery.

Plastics Solve Problems

Playing a big role in stepping up output and reducing packaging-line maintenance are new materials and techniques of construction.

Look at some specific examples: Teflon is applied to certain machine parts to provide anti-friction surfaces. It is coated on feed hoppers of dry fillers to prevent sticking of such products as brown sugar, cake mixes, and instant soluble coffee. Guide rails and conveyors lined with this plastic permit free travel of cartons and glass containers. Teflon facings over label-wiping pads avoid glue-pick up.

Moreover, accumulation of wax on funnels holding formed groups of waxed cartons in case packers is avoided through use of the plastic. And heat-sealing plates, spray-coated with Teflon, check sticking of certain plastic wrapping materials.

A ketchup bottler curbed line—downtime by silicon-coating guide bars and conveyors to prevent sticking and jamming of containers to and from filling machines.

In one instance, silicone is incorporated into rubber-base compounds for wiping pads on labelers. Such pads hold up longer than those made of rubber or Neoprene. Silicone rubber may some day be employed for high-temperature (500 deg. F.) heat-sealing purposes. Silicone- or Teflon-impregnated glass cloth also may be used to provide non-sticky surfaces.

Because of its resistance to oxygen and corrosive materials, plastic tubing—Tygon and Saran—is gradually replacing rubber for liquid-fillers hoses. And one equipment firm has substituted Tygon hose for rubber on air-control devices. Since these new hoses are transparent, it is now easy to spot a plug-up in the line.

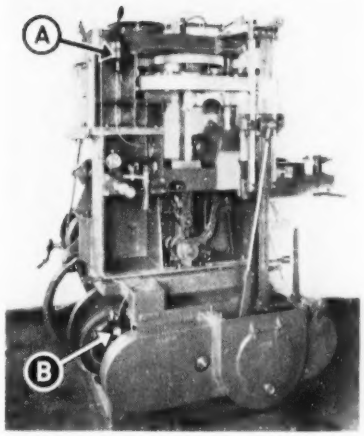
A specially designed pump is handling overflow from one type of liquid filler. Here, wear-resistant, Neoprene-molded impellers replace metal. And on the same filler, a small filter is straining the overflow prior to re-use.

Nylon bearing parts may be employed where corrosion resistance and noise reduction are sought. Where sugar or flour dust is a problem, sealed, self-lubricating bearings are going into certain machines.

Formica, in many cases, has replaced cast iron and steel in the construction of star wheels. It is easily sawed into shape, reduces glass breakage, readily withstands shocks, and minimizes noise.

Nylon bristles for wiping labels are becoming popular. These long-wearing, flexible bristles do not pick up moisture. Lightweight aluminum also is employed as a backing for bristles. Longer brushes, too, are providing more wiping time—50 percent more in the case of one type of labeler.

Going into heavy reciprocating parts more and more are lightweight aluminum and magnesium alloys. Such parts are stronger and can operate faster. In certain cases, parts are being fabricated of aluminum because this light material is readily machineable and non-corrosive.



ADEQUATE LUBRICATION of high-speed machines will avoid costly breakdowns. This Pneumatic Scale carton feeder and bottom sealer (shrouding removed) features Bijur-designed one-shot (A) and machine-driven (B) lubricators.

Also, non-corrosive metals are being used for machine parts subject to splatter by certain liquid foods or bottle breakage—particularly on lines handling fruit juices, vinegar, brine, and similar items.

Where corrosion is a problem on liquid and powder fillers, 18-8 type stainless steel is being employed for all parts.

Instead of being made from castings, some equipment is being constructed with heavy plate, shaped and welded in the machine manufacturer's shop.

These steel plates are desirable because they: (1) Are strong, (2) do not require patterns, (3) bend and weld easily to desired shape, (4) eliminate the need of relying on outside casting facilities, (5) require less machining, (6) take paint easier, and (7) don't crack as easily as castings.

Ductile iron is replacing malleable iron, cast steel, or cast iron in certain cases. This material offers excellent castability, high mechanical properties, good machinability, and superior shock-and-wear resistance. It goes into parts—cams, scale beams, and releasing levers on timing devices—that are subject to shock and operate at high speed.

Within a year, one equipment firm has fabricated over 250 individual parts out of ductile iron. Bronze was originally specified because it provided sound castings in thin sections, and non-ductile cast iron could not be

(Turn to page 126)

Packaging Special

(ADVERTISEMENT)

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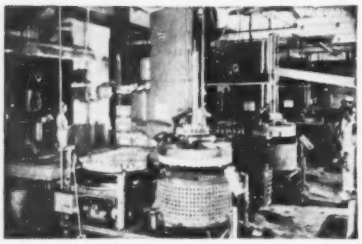
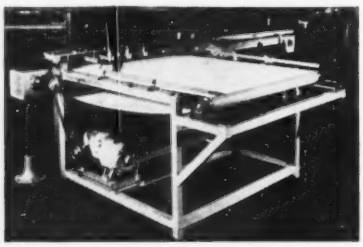
Three of our many installations, which have proven profitable to food packers, are illustrated and described below. These are offered as examples of the results of our work in collaboration with food packers and on specific problems. If you have similar or other problems in your plant it will pay you to talk to a Barnes' process engineer. There is no obligation for this service.



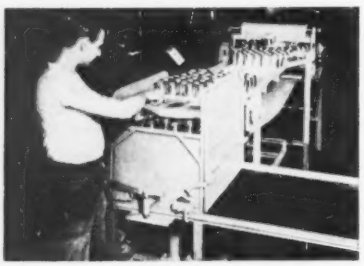
Load 500 Jars Per Minute

This Barnes retort crate loader handles 500 baby food jars per minute. It is one of many different machines designed and manufactured by Barnes to help the food packer lower costs, speed up handling, and minimize breakage.



Unscramble 500 Jars Per Minute with Barnes Single Filer

Here's a new, efficient method of unscrambling empty jars. The illustration shows operating end of machine where girls are positioned while dumping cases of glass onto the receiving conveyor belt. Jars are discharged to conveyor at the rate of 500 to 600 per minute, determined by size and shape.



Unload Over 600 Cans Per Minute with Barnes Packaged Can Unloader

This new dual purpose machine can be operated with only two men in continuous production while unloading 3 to 4 bags of cans per minute. The Barnes unloader handles 3 bags, each containing 265 No. 303 cans per minute, or 795 cans.

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Q. Exactly, what is the Martin Aseptic Canning System?

A. It is a system that provides a means of filling a sterile product into a sterile container, within a sterile atmosphere and closing it with a sterile lid.

Q. Is further processing of the product necessary?

A. No.

Q. Has the system been available for a long time?

A. No. Although short-time high-temperature sterilization has been available or possible on many products for a good many years, it wasn't until the Martin System was developed that there was equipment available for Commercial exploitation of the advantages gained from short-time high-temperature sterilization.

Q. What does W. F. and John Barnes Co. have to do with the system?

A. They are sales representatives for the Martin Aseptic Canning System and offer engineering, technical and service assistance on the installation and operation of the equipment.

Q. Where can we obtain more information about the merits of this system?

A. By writing to W. F. and John Barnes Company, Process Equipment Division, 301 South Water Street, Rockford, Illinois. Ask for bulletin E453.

Maintenance Checklist

This guide to effective procedure will help to keep your packaging lines going at full speed. Proved-in-practice pointers are included

7 Keys To Trouble-Free Line Operation

1. Inspect machines for need of repairs and replacements.

2. Devise an adequate system for recording delays and downtime.

3. Set up a workable machine-cleaning program.

4. Assign maintenance and set-up men to production lines.

5. Initiate a training program for the maintenance crew.

6. Adopt a foolproof lubrication schedule.

7. Work out an efficient system for making changeovers.

★ *See Numbered Sections in Article for Details* ★

YOUR PACKAGING line will operate efficiently only when it is maintained in ship-shape order.

And when breakdowns do occur, *speed* is essential in making repairs. Carrying them out smoothly–with minimum line-lost time–calls for properly trained line mechanics or machine-shop personnel. Essential, too, is an ample supply of spare parts.

Some firms save valuable time by simply rolling standby equipment into the line. Others follow a routine inspection-maintenance system, preparing repair schedules during the operating shift and then making the repairs during off-shifts. Maintenance is a two-fold job involving corrective and preventive steps.

Keeping packaging lines running at higher speeds–for faster throughout and with less downtime due to faulty operations–is the dual responsibility of the production and maintenance departments. To provide practical help in this direction, FOOD ENGINEERING presents the accompanying check list plus proved-in-practice pointers on nipping production slowdowns. Each point on this list will now be taken up in turn:

1—Checking for Repairs

In some cases, this inspection may be included in the lubrication program. Oilers in some companies report worn machine parts.

But it pays for those firms operating large packaging lines to establish a systematic machine-maintenance program. This involves inspecting and "miking" parts to determine wear and need of replacements.

Seasonally operated lines require complete overhauls only during slack seasons.

A possible method of curbing packaging-line breakdowns is the establishment of some form of inspection standards for machines. Such standards may be based upon maximum allowable down-time. When this period approaches, the machines involved should be shut down for repairs.

2—Recording Line-Downtime

Keeping case histories on machine repairs–a record of the job as well as labor and material charges–goes a long way toward better planning of maintenance schedules. In this way, recurring difficulties can be isolated and corrected. What's more, high maintenance costs can be checked.

Maintenance costs can be slashed by reducing those overtimes chargeable to inadequate planning and inspecting or the lack of standby equipment. Completely rebuilt replacement assemblies will help, as will machine improvements to eliminate troublesome operations.

In some plants, packaging-line operators record the extent and reasons for downtimes or daily production reports. These records are reviewed daily by production and maintenance supervisors, who determine the causes for the delays and then take corrective measures.

One firm employs a bell system for quickly signaling line mechanics when machines breakdown.

Another uses clocks for determining actual running time of machines. These clocks start when the machine begins operating, run only when machines do.

Still another has installed an Esterline-Angus recorder in the office of the bottling foreman. A break in the recorded line on the chart indicates a production-line breakdown. Reason for the downtime is reported daily by the assistant foreman.

3—Clean-Up of Machines

This may be the responsibility of either the packaging or maintenance department. Just how clean the machines should be is usually determined by the plant sanitarian or government inspectors.

(Turn to page 125)

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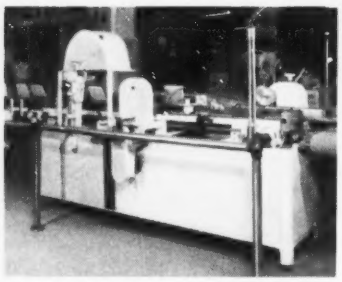
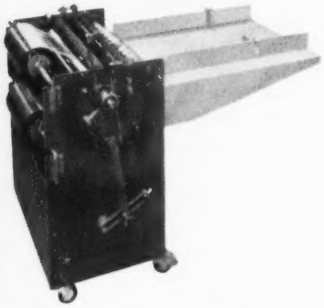


New Model CCY Carton Closer. This high-speed carton folding & closing machine produces 120 packages per minute. Highly versatile. Fully automatic. Handles lined or unlined cartons.



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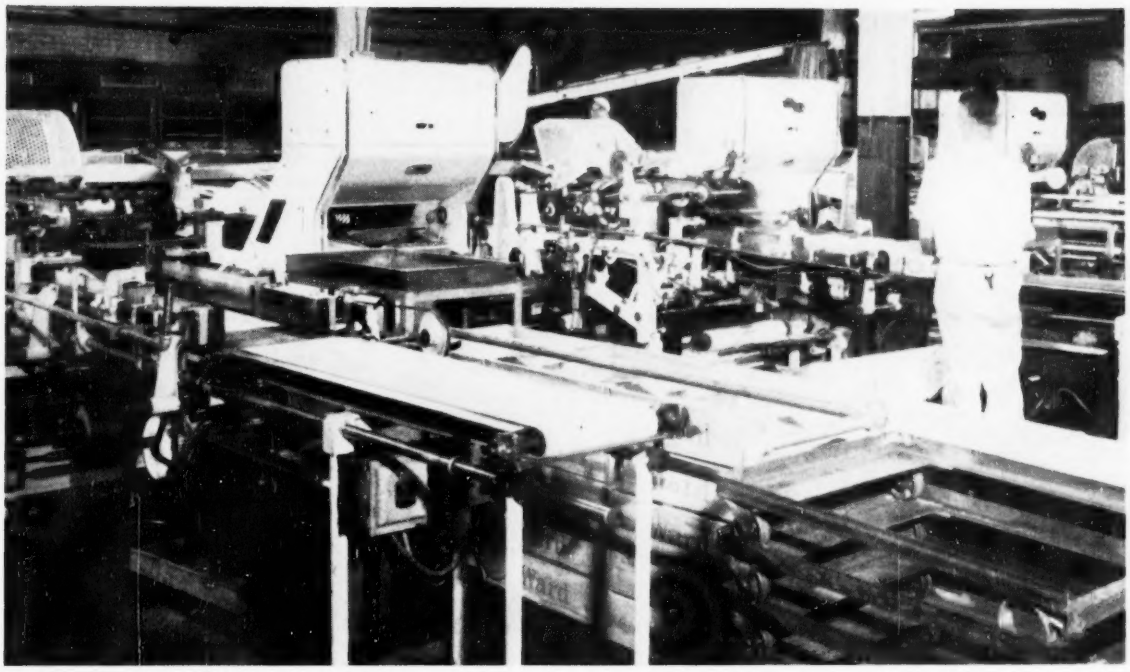

WRAPPING MACHINES must be carefully maintained to avoid costly production stoppage on automatic lines. Here in a Wards bakery, the bread wrappers and slicers are given constant, sharp-eyed attention to keep them running efficiently. Most large bakeries even have standby machines for emergencies. (American Machine & Foundry photo)

Smooth Packaging Operations Require

Alert Machine Maintenance

Here are practical pointers on cleaning and repairing your wrapping machines to avert line delays. Methods are applicable to other units

BYRON A. ENGELBACH

Consulting Engineer, Boston; Formerly Chief Plant Engineer, New England Confectionery Co., Cambridge, Mass.

A PACKAGING machine is designed to handle products at a given rate of speed and in conformance with specific quality standards. It's also intended to operate without interruption for a specified production period and to give service over a number of years.

But such performance cannot be achieved unless the machine is kept in tip-top condition.

Effective maintenance starts with the selection of equipment. Take a new wrapping machine. It must have these significant features to please the maintenance department: (1) Ease of changeover to various size packages, (2) adequate lubrication facilities, (3) accessibility of parts for cleaning and repairing, and (4) freedom from noise and vibrations.

With packaging equipment, two major maintenance jobs are involved—cleaning and repairing. It must always be maintained in as clean and mechanically perfect a condition as possible to insure efficient production.

Picture the condition of a wrapping machine after a marshmallow frosted cake has jammed in a wrapping head, or after a chocolate-coated, soft-centered candy bar fails to feed properly onto the elevator platform and is crushed.

Such jam-ups are due to accumulation of foreign matter on guide rails, paper guides, feed rolls, paper-cutting mechanism, and other contact points. Here, it's a question of periodically shutting down and cleaning the machine to avert trouble before it can start—or being forced to stop the unit because of a jam-up.

A short-sighted manufacturer will try to save ten minutes of cleaning time only to find himself losing over half an hour's production because of the need of cleaning a jam-up or making mechanical repairs.

Simple cleaning jobs—involving paper fouling and minor jam-ups—can be cared for by operators who have received training from representatives of the maintenance department or of the machine manufacturer.

It is always best that major cleaning jobs be assigned to a thoroughly trained employee of the maintenance rather than the production department. In most instances, a certain amount of dismantling is required to

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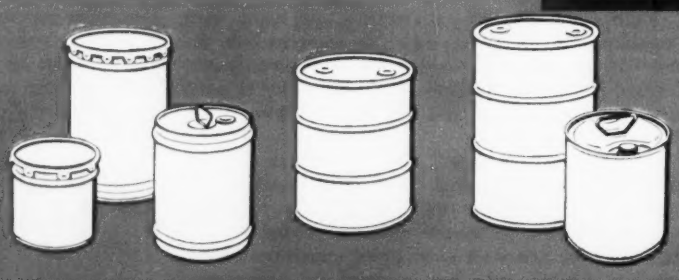

expose parts that require cleaning at less frequent intervals. In cases of major work stoppage, trained personnel should clear and clean the unit, thereby giving them an opportunity to observe the source of the trouble.

If such cleaning is the duty of maintenance personnel, it is possible to train them in preventive maintenance, which involves intelligent mechanical inspection during clean-ups. Inspection of this type will prevent line-down-time due to the need of mechanical repairs, which should be made while the machine is not on a scheduled run. Work of this nature can be the training ground for eventual promotion to mechanical-repair work and the needed incentive to insure efficient cleaning.

Unfortunately, major cleaning work is often assigned to production help—which frequently finds such tasks distasteful. And unless there is exceptional critical supervision, the best to expect from those with such an attitude is wasteful, slipshod cleaning.

Assignment of this type of cleaning is usually on a rotation basis. Thus, the employee would not monotonously be cleaning the same unit every time.

Remember that improperly trained cleaners can do more harm than good.

Keep Moisture From Machines

Moisture-laden, compressed air used for cleaning will damage a machine. Replacement parts will be required because of erosion due to rusting. This pitting will result in the build up of foreign matter on contact surfaces, thereby causing friction and poor operation or damage to the product.

Steps should be taken to eliminate as much moisture from the atmosphere as possible before it reaches the distribution system. In most cases, a single aftercooler installed between the compressor and the air receiver will be sufficient. All branch air connections to the distribution system should be made from the top side of the main line, thereby avoiding any condensed water carry-over.

Moisture separators at strategic places in the system will prove effective. And those with an automatic moisture discharge will require little attention.

Another simple and effective way to prevent condensed moisture from reaching nozzles on air lines is to install a water leg below the take-off hose connection. Also put a draw-off cock at the bottom of the leg. This cock should be opened to bleed the line prior to using the air hose. And the air hose should always be cleared before using it on equipment.

It is not wise to use a steam hose or a combination of high pressure steam and liquid, or compressed air and liquid, to clean wrapping machines.

Cleaning With Detergents

If liquids are needed to remove foreign materials, it is advisable to use them sparingly. Suppliers of detergents will provide expert advice on the proper use of cleaning agents.

Care should be taken to prevent liquids from reaching those machine parts likely to become damaged. For the most part, the manufacturers have designed equipment to withstand reasonable amounts of liquids. Parts that require washing, such as glue pots, wrapping heads, pressure rolls, or the like, are usually easily removable. Above all, the machine should be thoroughly dry before the cleaning job is completed.

The accumulation of foreign material on contact surfaces may result in faulty operation. Certain types of printing inks rub off, causing a drag, which in turn results in poor positioning of the wrapper at the tucking, folding, or wrapping stations. The ink may also smudge. One way to minimize this objectionable condition is to apply hard wax at points of contact. A change in the degree of material finish is another solution.

Accumulation of Products

Build up of product on contact surfaces can create difficulties. One example is the accumulation of sugar on a feed chute handling sugar-coated products. This is attributed to moisture regain of the sugar. And once the tacky material starts to build up, work stoppage soon results. The application of hard wax to the chute will help, but not cure, this condition. Much of this difficulty can be avoided by carrying out operations at low humidities.

Certain plastics prevent product build-ups. These can be purchased in sheet, molded, or extruded forms, and they can be fused directly onto metal. Sheets may be secured to surfaces by clamps, spring loaded clips, or countersunk screws.

Much machine cleaning can be eliminated by installing scrap pans and dust shields at strategic locations. In many instances, such simple additions to the machine can save many hours of cleaning and repairing, particularly if the product is abrasive or oil absorbent.

Care should be taken to keep all parts free of glue. Paper jamming or poor wrapping spread glue to package-contact surfaces. If this glue is not removed, the machine must be shut down for thorough cleaning. Too often, operators will run out a paper jam and not bother to clean off the moist glue. Invariably, a serious jam follows, creating mechanical damage and a shut-down for lengthy repairs.

Operators should be instructed on keeping heat-sealing stations free of product when the machine is shut down, even if this means removing partially wrapped products by hand. Since surfaces must be hot to seal properly, difficulties occur due to long contact time. Hot surfaces are not easy to clean, and it is often necessary to cool them.

Manufacturers can advise on the grades and types of lubricants as well as the frequency of lubing wrapping machines. The product, cycle speed of operation, length of production run, and zone conditions should be considered when setting up a lubrication procedure.

Sooner or later a gear, sprocket, or shaft bearing will need replacement. Or a rocker arm will require rebushing. Any good mechanic can make these repairs. The difficult phase of mechanical maintenance is knowing what causes the machine to operate poorly, where the trouble lies, and how to fix the unit in as short a time as possible.

Properly Trained Mechanics

As a rule, a good mechanic can quickly spot the trouble and make the necessary adjustments in short order. This is because he has, through experience, developed a method of quick checks and elimination.

Training of mechanics by a manufacturer's representative is invaluable—a good investment even though costly. "On-the-job" training under a good boss is the next best method. Learning the "hard way" can be costly for the employer, but it is sometimes the only way.

More than one processor has shut down a unit and called a manufacturer's representative because the repair man was untrained. Many hours of training and experience are needed before even the best of craftsmen can be considered good wrapping-machine mechanics.

Changes in temperature and relative humidity have resulted in complete shut-down of machines. Some wrapping materials are adversely affected by fluctuations in the moisture content of the air. This trouble is one of the most difficult to discover and correct. In certain instances, old wrapping materials will create difficulties. So it is always a good practice to use mill stock on a FIFO basis—first-in, first-out. Some wrapping materials require special storage conditioning, which the supplier will recommend to the user.

When product sizes vary beyond fixed limits, it is not wise to compensate for these variations at the wrapping stage, except to run-out the "out-size" stock. Instead, correct the source of the error.

Some units are designed to handle a specific size product with only small tolerances for variations. Adjustments might be made to run-out out-of-size products using a high precentage of scrap, but the unit could not be operated permanently on this basis.

Correcting Loose-Wrapping

Even experienced mechanics have trouble correcting loose-wrapping, even though the folds, tucks, and sealing are perfect. In this case, first check the size of the paper, then the folding head and tension clips. A change in paper weight or even material may result in loose-wrapping.

Stretched or worn drive-chains or feed-conveyor chains may cause trouble due to back-lash. Knowing when to replace parts and how to compensate for wear by minor adjustment is the simplest part of this problem. Recognizing the need for minor adjustments is the difficulty facing the mechanic.

Dull or nicked cutting knives are trouble makers, for the paper will fail to position correctly. Knives must be changed when the wrapper shows ragged rather than clean-sheared edges. Maybe it is only necessary to adjust the spring tension or re-sharpen the knives.

It is important to maintain tension on the wrapper-mill roll. There should be more tension at the start and less toward the end of the roll. Inertia of the roll is greater when it is first put on the unit. Too much tension will snap the paper. Too little tension will permit the roll to coast after the required length has fed through the feed mechanism. And then the paper will snap at the start of the next cycle.

Some units have a compensating take-up mechanism that constantly feeds the roll. This paper feed requires less care in adjusting tension or drag devices.

Once set, the paper-feed and cut-off mechanism require very little attention. Occasionally, the paper slips because pressure on the feed rolls is not adjusted after a re-threading, or because foreign matter builds up on the rolls. These conditions are not difficult to recognize or correct. Often, a good machine operator will make the necessary corrections without the services of a mechanic.

Various devices are employed to position paper after it is cut to length. Occasionally these devices require adjustment. Belts stretch and become worn, or the spring tension loosens due to fatigue. Replacement of paper positioning belts can be a major repair job on some units. The mechanic should periodically check them so that the work can be scheduled during a shut-down or over a weekend.

Units equipped with electric eyes for controlling the paper feed require specially trained mechanics who can recognize the difference btween electrical and mechanical troubles. The compensating positioning mechanism should be carefully studied and thoroughly understood before re-adjustments are undertaken. The electrician should be the only one permitted to work on the electronic unit.

In purchasing an electric-eye device, some thought should be given in specifying the color range. The purchase of a so-called "all purpose" eye might be the means of a saving in printing costs. The eye-spot color could be in the wrapper design and would not require a special printing plate, as might be the case if the range of the eye were fixed.

Spotting Gluing Difficulties

When the wrapper fails to seal properly, the mechanic must recognize mechanical failure or a faulty sealing medium. Too much glue can be as disastrous as too little glue. In one instance, the seal will fail to hold after release from the pressure section because the glue has not set. On the other hand, the glue may set so rapidly that both surfaces are not caught. Adjustment of the applicator rolls will usually correct this situation. Need of cleaning the gluing unit can also be ascertained.

The glue applicator and glue pots are usually easy to remove. In such cases, it is sometimes advisable to have a spare unit available to replace one that is troublesome. This is especially true where there are several identical units in operation.

A change in material or surface finish of the wrapper is likely to create sealing difficulties. If this condition cannot be easily corrected, the glue manufacturer will be of great assistance. Usually a change in the amount of water in the mixing formula will do the trick.

Too often, heat-sealing units operate at a critical voltage, and a drop in voltage will lower the temperature of the plates and result in inadequate sealing. A dial and stem thermometer installed in the sealing plates will indicate plate temperatures. In some instances, increasing the pressure at the contact points will assure a strong seal. Material changes in the heat-sealing type of wrappers may cause a great deal of trouble.

Clearing Jam-Ups

When a jam-up occurs, the operator should instantly stop the machine. It should be cleared by run-outs under power. In some instances, it may be possible to clear the machine by turning it over by hand without causing mechanical damage. However, this should only be done by a competent mechanic. Furthermore, if the mechanic clears the machine, he can easily and quickly determine the extent of the damage and its basic cause.

Static electricity, even on well-grounded units, may be directly responsible for poor wrapping. Because of the design of the machine, it may not be possible to thoroughly ground all parts. In this case, simple wiping fingers attached to the grounded part of the machine will correct the trouble. If this is not possible, more elaborate and expensive ready-built static eliminators may be needed.

Raising the relative humidity of the zone of operation and thus increasing the moisture content of the wrapper has been known to abolish static. But this practice may create other types of trouble or product damage.

There is a critical top speed beyond which it ceases to be economical to operate a machine. This speed is not constant for all products that can be run through the unit. Several factors contribute to this critical speed. They include composition and surface finishes of the wrapper, type and tightness of wrap, type of seal, resilience of the wrapper, and type of product.

(Turn to page 126)

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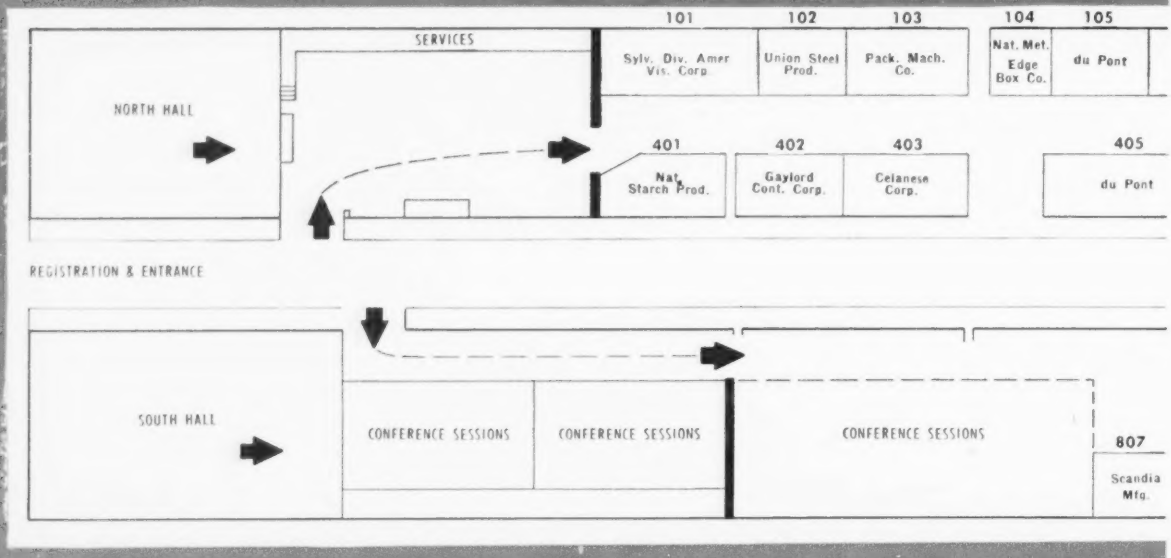
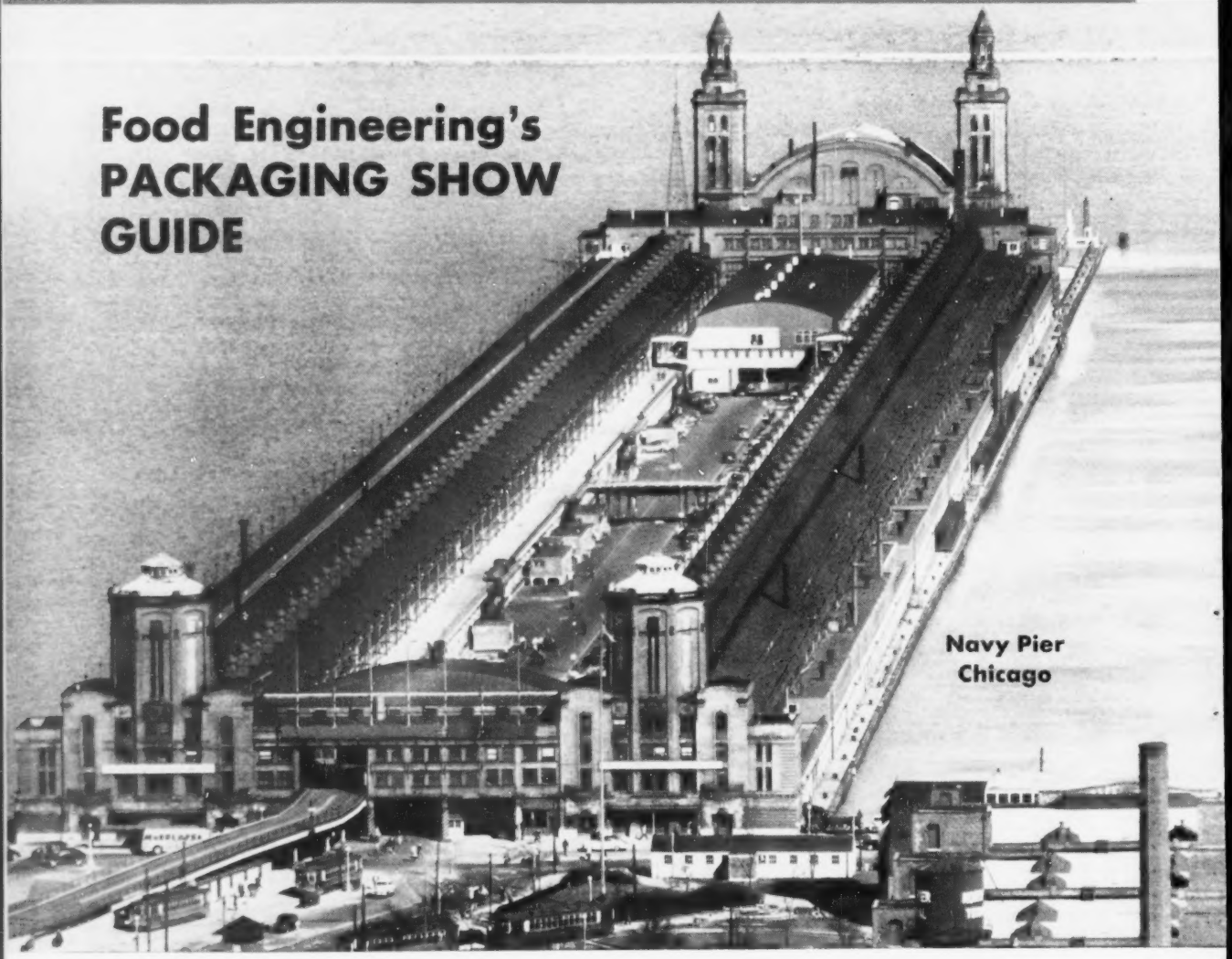
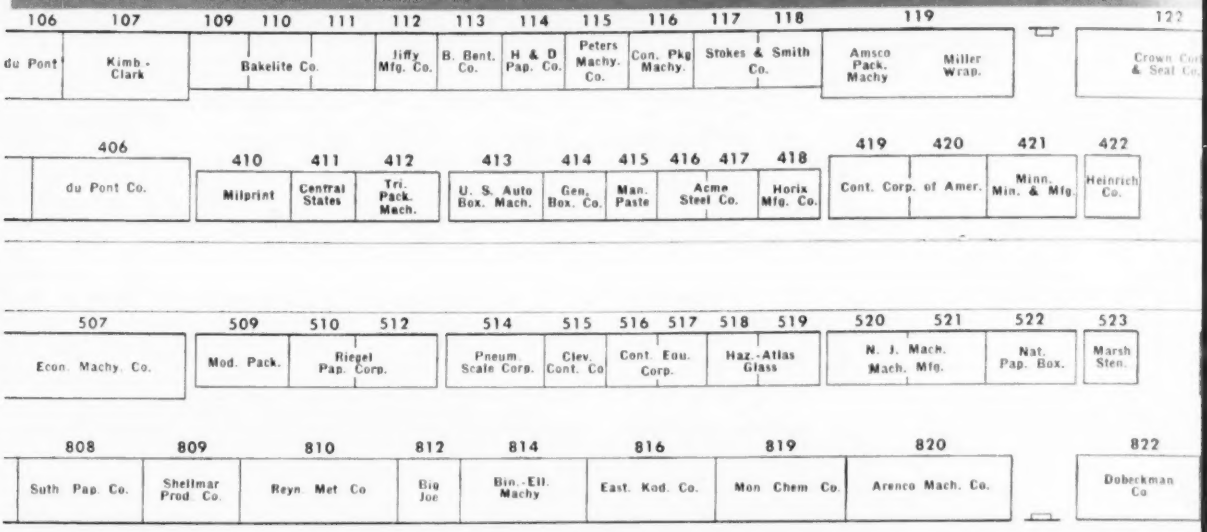
EXHIBIT FLOOR PLAN



Food Engineering's PACKAGING SHOW GUIDE



Navy Pier
Chicago



LIST OF EXHIBITORS

22nd National Packaging Exposition

April 20-23, 1953

EXHIBITING HOURS

Monday, April 20: 10 A.M.–6 P.M.

Tuesday, April 21: 10 A.M.–10 P.M.

Wednesday, April 22: 10 A.M.–6 P.M.

Thursday, April 23: 10 A.M.–3 P.M.

Companies and Booths

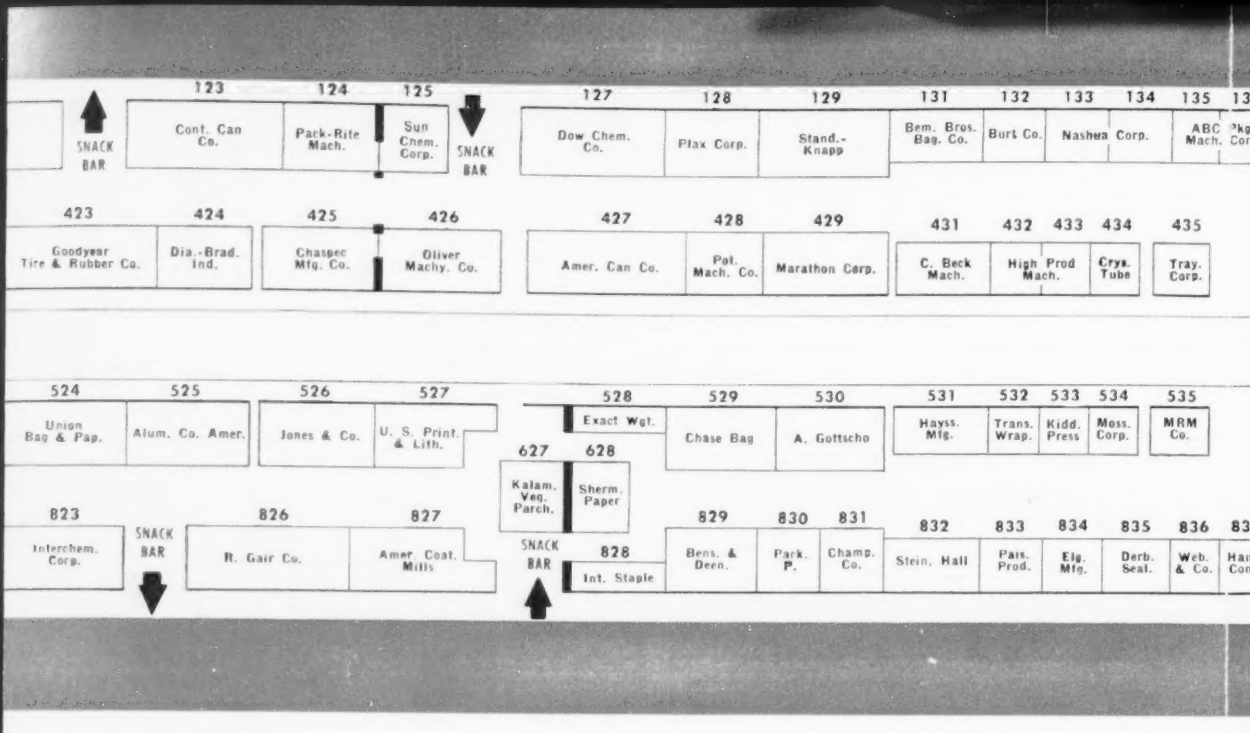
(Letters after booth numbers: NH—North Hall; SH—South Hall)

—A

EXHIBITOR	BOOTH
A-B-C Packaging Machine Corp.	135, 136-NH
Acme Steel Co.	416, 417-NH
Addressograph-Multigraph Corp.	185-NH
Ajusto Equipment Co.	868-SH
Alemite Div., Stewart-Warner Corp.	174, 175-NH
Algene Marketing Equipment Co.	256-NH
W. F. Altenpohl, Inc.	184-NH
Aluminum Co. of America	525-SH
Aluminum Foils, Inc.	672-SH
American Can Co.	427-NH
American Cellubox Corp.	671-SH
American Coating Mills Corp.	827-SH
American Cyanamid Co.	851, 852-SH
American Excelsior Corp.	354, 355-NH
American Instrument Co.	588-SH
American Marking Corp.	464-NH
American Partition Co.	549-SH
American Type Founders, Inc.	577-SH
Amsco Packaging Machinery Inc.	119-NH
Arabol Mfg. Co.	649, 749-SH
Arenco Machine Co., Inc.	820-SH
Armour and Company, Curled Hair Div.	572-SH
Arvey Corp.	536-SH
Askania Regulator Co.	267, 268-NH
The Associated Cooperage Industries of America, Inc.	344-SH
Atlantic Gummed Paper Corp.	245, 246-NH
Atlas Plywood Corp.	156, 157-NH
Automatic Web Control Mfg. Co.	675-SH
Avery Adhesive Label Corp.	254, 255-NH

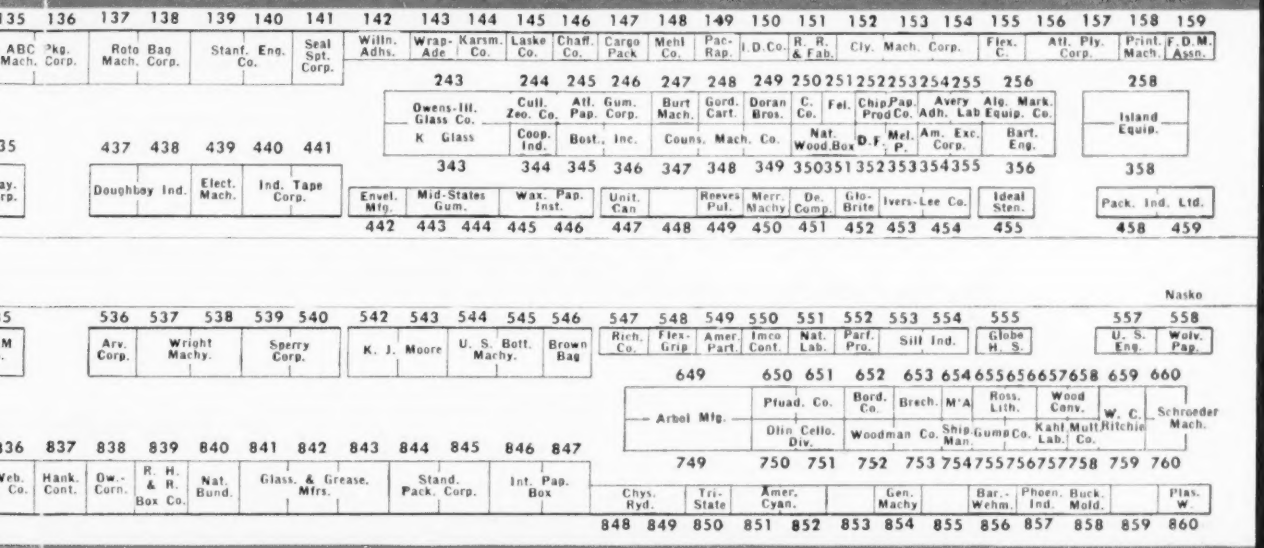
—B

EXHIBITOR	BOOTH
B-B Shipping Room Supply Co.	523-SH
Bakelite Co., A Division of Union Carbide & Carbon Corp.	109, 110, 111-NH
Barry-Wehmiller Machinery Co.	856-SH
Bartelt Engineering Co.	356-NH
Battle Creek Bread Wrapping Machine Co.	878-SH
Charles Beck Machine Corp.	431-NH
Bemis Bro. Bag Co.	131-NH
Bensing Bros. & Deeney Sales Co.	829-SH
Benj. C. Betner Co., Div. of Continental Can Co., Inc.	113-NH
Better Packages Inc.	364-NH
Big Joe Mfg. Co.	812-SH
Biner-Ellison Machinery Co.	814-SH
Bonnell Publications, Inc.	460-NH
The Borden Co., Chemical Div.	652-SH
Bostitch, Inc.	345, 346-NH



EXHIBITOR	BOOTH
Peter D. Bowley & Associates	569-SH
Brecher Bros.	653-SH
E. W. Brilmayer Laboratories, Inc.	469-NH
Brown Bag-Filling Machine Co., Inc.	546-SH
Buckeye Molding Co.	858-SH
B. H. Bunn Co.	486-NH
Burt Machine Co.	247-NH
F. N. Burt Co., Inc.	132-NH
—C	
Cameron Machine Co.	482-NH
C.I.T. Corp.	583-SH
Cargo Packers Inc.	147-NH
Celanese Corp. of America, Plastics Div.	403-NH
Celluplastic Corp.	468-NH
The Celon Co.	250-NH
The Celotex Corp.	772-SH
Central States Paper and Bag Co., Inc.	411-NH
Ralph Chaffee & Co.	146-NH
Chain Belt Co. of Milwaukee	582-SH
Champlain Co., Inc.	831-SH
Chase Bag Co.	529-SH
Chase Equipment Corp.	664-SH
The Chaspec Manufacturing Co.	425-NH
Chester Packaging Products Corp.	563, 564-SH
Chippewa Paper Products Co., Inc.	252, 253-NH
Chisholm Ryder Co. of Pennsylvania	848, 849-SH
The Clark-Aiken Co.	166, 167, 168-NH
Clark Equipment Co., Industrial Truck Div.	199-NH
The Cleveland Container Co.	515-SH
Clybourn Machine Corp.	152, 153, 154-NH
Arthur Colton Co.	877-A-SH
Colt's Manufacturing Co.	879, 880-SH
Consolidated Packaging Machinery Corp.	116-NH
Container Corp. of America	419, 420-NH
Container Equipment Corp.	516, 517-SH
Continental Can Co., Inc.	123-NH
Counsel Machine Co., Inc.	347, 348, 349-NH
Crescent Ink & Color Co. of Penna.	180-NH
Crown Cork and Seal Co.	122-NH

EXHIBITOR	BOOTH
Crystal Tube Corp.	434-NH
Culligan, Inc.	244-NH
—D	
Daffin Manufacturing Co.	186-NH
Daher Co., Holland Box Div.	565-SH
Dennison Manufacturing Co.	264-NH
Dependable Compressor & Machine Co.	451-NH
Derby Sealers, Inc.	835-SH
Diagraph-Bradley Industries, Inc.	424-NH
Dilts Machine Works	480-NH
Dispens-A-Label Devices	669-SH
The Dobeckmun Co.	822-SH
Doran Brothers, Inc.	249-NH
Doughboy Industries, Inc.	437, 438-NH
The Dow Chemical Co.	127-NH
Dumatic Industries	865-SH
E. I. du Pont de Nemours & Co., Inc.	105A, 106, 107, 405, 406-NH
Durethene Corp.	179-NH
—E	
Eastman Chemical Products, Inc.	866, 867-SH
Eastman Kodak Co.	816-SH
Economic Machinery Co., Div. Geo. J. Meyer Mfg. Co.	507-SH
Electronic Machinery Parts, Inc.	439-NH
Elgin Manufacturing Co.	834-SH
Envelope Manufacturers Assn. of America	422-NH
The Exact Weight Scale Co.	528-SH
—F	
Felins Tying Machine Co.	251-NH
J. L. Ferguson Co.	665-SH
Fibre Drum Manufacturers Assn.	159-NH
The F. G. Findley Co.	567-SH
Dave Fischbein Co.	352-NH
Flexible Package Co.	155-NH
Flexigrip Inc.	548-SH
Folding Paper Box Assn. of America	673, 674, 773, 774-SH



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EXHIBITOR	BOOTH
FOOD ENGINEERING	***579-SH***
Food Machinery & Chem. Corp.	**117, 118-NH**
H. B. Fuller Co.	**483-NH**
Fulton Bag & Cotton Mills	**465-NH**

—G

G. D. Societa Anonima	**586-SH**
Robert Gair Co., Inc.	**826-SH**
Gaylord Container Corp.	**402-NH**
General Box Co.	**414-NH**
General Electric Co.	**584, 585-SH**
General Gummed Products, Inc.	**670-SH**
General Machinery Corp.	**854-SH**
General Research & Supply Co.	**481-NH**
A. J. Gerrard & Co.	**375-NH**
Gerrard Steel Strapping Div., U. S. Steel	**874-SH**
The Glassine & Greaseproof Manufacturers Assn.	**841, 842, 843-SH**
Glo-Brite Products, Inc.	**452-NH**
Globe Heat-Seal, Inc.	**555-SH**
B. F. Goodrich Chemical Co.	**162, 163-NH**
The Goodyear Tire & Rubber Co., Inc.	**423-NH**
Gordon Cartons, Inc.	**248-NH**
Adolph Gottscho, Inc.	**530-SH**
Gravure Cylinder Corp.	**876-SH**
Graymills Corp.	**467-NH**
Great Lakes Stamp & Mfg. Co., Inc.	**266-NH**
Greenwood Packaging Supply Co.	**575, 576-SH**
B. F. Gump Co.	**755, 756-SH**
Ferdinand Gutmann & Co.	**863, 864-SH**

—H

Hampton Mfg. Co., Industrial Tape Div.	**470-NH**
Hankins Container Co.	**837-SH**
Hayssen Manufacturing Co.	**531-SH**
Hazel-Atlas Glass Co.	**518, 519-SH**
H. H. Heinrich Co.	**422-NH**
The John Hewson Co.	**474-NH**
High Production Machine Co., Inc.	**432, 433-NH**
Hilker Products Corp.	**265, 365-NH**
The Hinde & Dauch Paper Co.	**114-NH**
Hobbs Manufacturing Co.	**573, 574-SH**
Alfred Hofman Co.	**493-NH**
Hol-Bag, Inc.	**488-NH**
The Floyd A. Holes Co.	**178-NH**
Horix Manufacturing Co.	**418-NH**
Hudson-Sharp Machine Co.	**170, 171, 172, 173-NH**

—I

I. D. Co., Fancy Container Div.	**150-NH**
Ideal Stencil Mach'ne Co.	**455-NH**
Ideal Stitcher Co.	**587-SH**
Imco Container Corp.	**550-SH**
Industrial Tape Corp.	**440, 441-NH**
Inland Container Corp.	**883, 884-SH**
Inland Wire Products Co.	**373, 374-NH**
Inman Manufacturing Co.	**870-SH**
Intaglio Service Corp.	**562-SH**
Interchemical Corp., Printing Ink Div.	**823-SH**
International Paper Co.	**181-NH**
Int. Paper Box Machine Co.	**846, 847-SH**
International Staple & Machine Co.	**828-SH**
Island Equipment Corp.	**258, 358-NH**
The Ivers-Lee Co.	**453, 454-NH**

—J

Jiffy Manufacturing Co.	**112-NH**
R. A. Jones & Co., Inc.	**526-SH**

—K

Kahlenberg Laboratories	**757-SH**
Kalamazoo Vegetable Parchment Co.	**627-SH**
Paul L. Karstrom Co.	**144-NH**
Kellogg Container	**368, 369, 370, 371, 372-SH**
Kidder Press Co., Inc.	**533-SH**
The Karl Kiefer Machine Co.	**765-SH**
Kimberly-Clark Corp.	**107-NH**
Kimble Glass Co.	**243, 343-NH**
Kingsbury & Davis Machine Co.	**881-SH**
Kliklok Corp.	**177-NH**
Frederick A. Krause Associates, Inc.	**165-NH**

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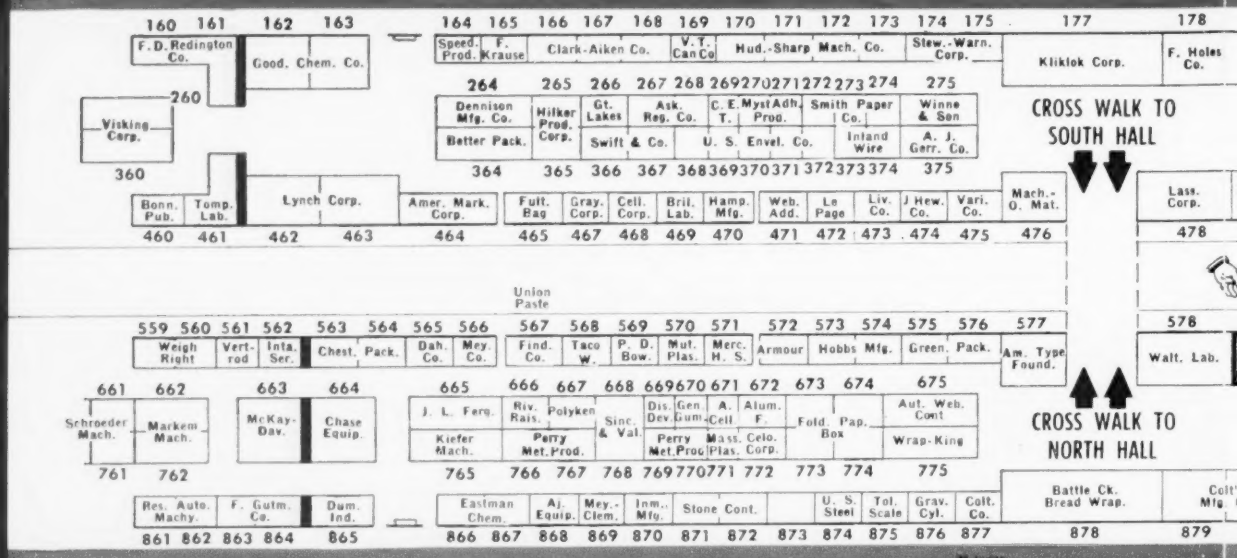

EXHIBITOR — BOOTH

—L

The Lasko Co., Inc. 145-NH
Lassiter Corp. 478-NH
Le Page's Inc. 472-NH
Lynch Corp., Packaging Machine Div. ..462, 463-NH

—M

MRM Co., Inc. 535-SH
Machine-O-Matic, Inc. 476-NH
Machinery Mfg. Co., Inc. 520, 521-SH
Manhattan Paste & Glue Co., Inc. 415-NH
Marathon Corp. 429-NH
Mark'Andy, Inc. 654-SH
Markem Machine Co. 662, 762-SH
Marsh Stencil Machine Co. 523-SH
Mass. Plastics Corp. 771-SH
McKay-Davis Chemical Corp. 663-SH
McLaurin-Jones Co. 877-SH
Mehl Manufacturing Co. 148-NH
Melrose Packaging 353-NH
Mercury Heat Sealing Equipment Co. 571-SH
Merrill Machinery Sales Co. 450-NH
Meyer-Clement Inc. 869-SH
The Meyercord Co. 566-SH
Mid-States Gummed Paper Co. 443, 444-NH
Miller Wrapping & Sealing Machy. Co. 119-NH
Milprint, Inc. 410-NH
Minnesota Mining & Manufacturing Co. 421-NH
Modern Packaging 509-SH
Monsanto Chemical Co. 819-SH
Kenneth J. Moore & Co. 542, 543-SH
Mosstype Corp. 534-SH
The Multistamp Co. 758-SH
Mutual Plastic Mold 570-SH
Mystik Adhesive Products 270, 271-NH

—N

Nashua Corp. 133, 134-NH
Nasko Machinery Corp. 558-SH
National Adhesive Div. of
National Starch Products, Inc. 401-NH
National Bundle Tyer Co. 840-SH
National Container Corp. 595-SH
National Laboratories & Mfg. Corp. 551-SH
National Metal Edge Box Co. 104-NH
National Paper Box Manufacturers Assn. 522-SH
National Wooden Box Assn. 350, 351-NH
New Jersey Machine Corp. 520, 521-SH

—O

Olin Cellophane 750, 751-SH
Oliver Machinery Co. 426-NH
Owens-Corning Fiberglas Corp. 838-SH
Owens-Illinois Glass Co. 243, 343-NH

—P

Package Machinery Co. 103-NH
Packaging Industries Ltd., Inc. 458, 459-NH
Packaging Parade 830-SH
Pack-Rite Machines 124-NH
Paisley Products, Inc. 833-SH
Pak-Rapid Inc. 149-NH
Paper Converting Machine Co. 187-NH
Parfait Promotional Packaging Co. 552-SH
Penn Tape Savers Div. Livingston Co. 473-NH
Perry Metal Products Co. 766, 767, 769, 770-SH
Peters Machinery Co. 115-NH
The Pfaudler Co. 650- 651-SH
Phoenix Industries, Inc. 857-SH
Pitney-Bowes Inc. 885-SH
Plastics World 860-SH
Plax Corp. 128-NH
Pneumatic Scale Corp., Ltd. 514-SH
Polyken Industrial Tape 667-SH
Popper & Sons, Inc. 580, 581-SH
Potdevin Machine Co., Inc. 428-NH
The Printing Machinery Co. 158-NH

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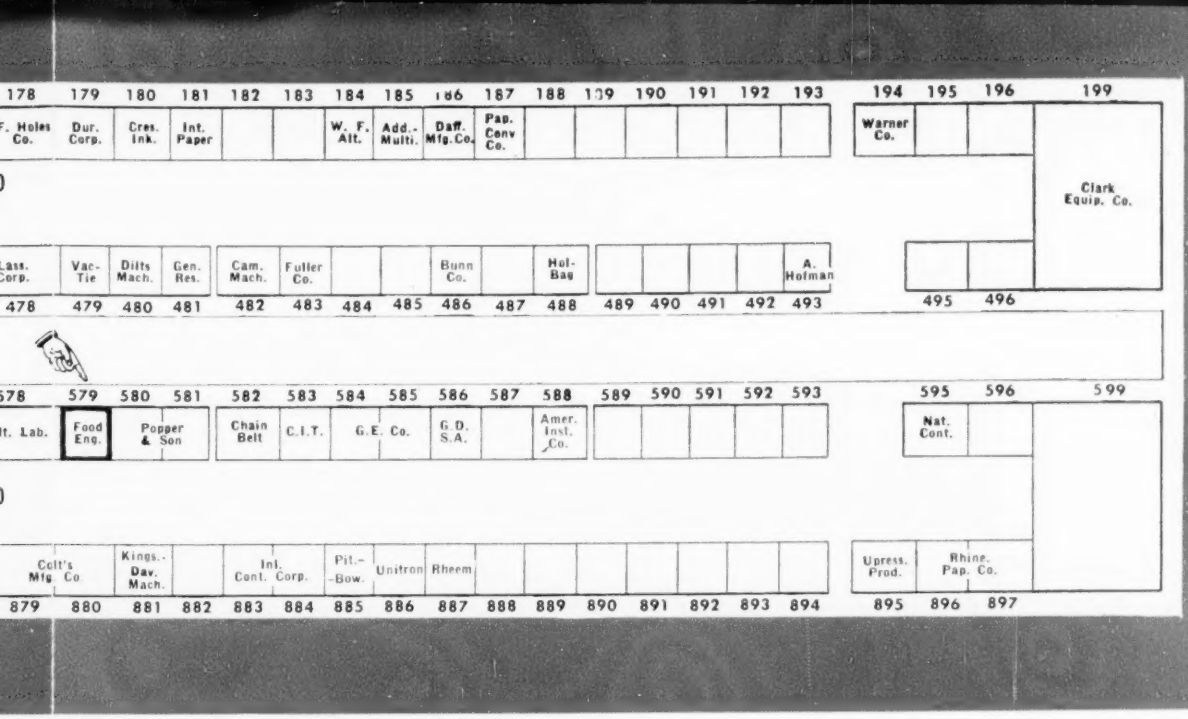
Rainbow Ribbons and Fabrics, Inc. 151-NH
Rathborne Hair and Ridgway Box Co. 839-SH
F. B. Redington Co. 160, 161-NH



EXHIBITOR	BOOTH
Reeves Pulley Co., Inc.	449-NH
Resina Automatic Machinery Co., Inc.	861, 862-SH
Reynolds Metals Co.	810-SH
Rheem Mfg. Co.	887-SH
Rhinelander Paper Co.	896, 897-SH
J. A. Richards Co.	547-SH
Riegel Paper Corp.	510, 512-SH
W. C. Ritchie and Co.	659, 759-SH
River Raisin Paper Co.	666-SH
Rossotti Lithograph Corp.	655, 656-SH
Roto Bag Machine Corp.	137, 138-NH
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Scandia Manufacturing Co.	807-SH
Schroeder Machines Corp.	660, 661, 760, 761-SH
Seal-Spout Corp.	141-NH
Shellmar Products Corp.	809-SH
Sherman Paper Products Corp.	628-SH
Shipping Management	754-SH
Sill Industries	553, 554-SH
Simplex Packaging Machy. Co.	119-NH
Sinclair & Valentine Co.	668, 768-SH
H. P. Smith Paper Co.	272, 273, 274-NH
Speedry Products, Inc.	164-NH
Standard-Knapp Div. of Emhart Mfg. Co.	129-NH
Standard Packaging Corp.	844, 845-SH
Stanford Engineering Co.	139, 140-NH
E. G. Staude Div. of the Sperry Corp.	539, 540-SH
Stein, Hall & Co., Inc.	832-SH
Stokes & Smith Co., Div. of Food Machinery & Chemical Corp.	117, 118, 119-NH
Stone Container Corp.	871, 872-SH
Sun Chemical Corp.	125-NH
Sutherland Paper Co.	808-SH
Swift & Co., Adhesive Products Dept.	366, 367-NH
Sylvania Division, American Viscose Corp.	101-NH
—T	
Taco West Corp.	568-SH
Toledo Scale Co.	875-SH
Tompkins' Label Service	461-NH
Transparent Wrap Machine Corp.	532-SH
Traver Corp.	435-NH
Tri-State Plastic Molding	850-SH
Triangle Package Machinery Co.	412-NH
C. E. Twombly Co.	269-NH
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Union Bag & Paper Corp.	524-SH
Union Paste Co.	567-SH
Union Steel Products Co.	102-NH
United Can Co., Inc.	447-NH
U. S. Automatic Box Machinery Co., Inc.	413-NH
U. S. Bottlers Machinery Co.	544, 545-SH
U. S. Engineering Co.	557-SH
United States Envelope Co., Kellogg Container Div.	368, 369, 370, 371, 372-NH
U. S. Printing & Litho. Co.	527-SH
Unitronics, Inc.	886-SH
Upressit Products Corp.	895-SH
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Vac-Tie Fastener, Inc.	479-NH
Varigraph Co., Inc.	475-NH
Vertrod Corp.	561-SH
The Visking Corp.	260, 360-NH
Vulcan Tin Can Co.	169-NH
—W	
Walton Laboratories, Inc.	578-SH
Warner Electric Brake & Clutch Co.	194-NH
Waxed Paper Institute, Inc.	145, 146-NH
H. G. Weber & Co., Inc.	836-SH
Weber Addressing Machine Co.	471-NH
Weigh Right Automatic Scale Co.	559, 560-SH
Williamson Adhesives, Inc.	142-NH
Frank W. Winne & Son, Inc.	275-NH
Wolverine Paper Converting Machinery Corp.	538-SH
Wood Conversion Co.	657, 658-SH
The Woodman Co., Inc.	752, 753-SH
Wrap-Ade Machine Co., Inc.	143-NH
Wrap-King Corp.	775-SH
Wright Machinery Co.	537, 538-SH

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MAINTENANCE CHECKLIST

—*Continued from page 111*

The amount of cleaning may influence the need for off-shift, clean-up work in addition to that performed on-shift. Superficial cleaning may be carried out by line operators during or after production hours. Only exception is when operators are on an incentive plan.

In some cases, mechanics or set-up men may help. Where superficial clean-up practices are followed during off-production hours, 10 to 15 min. should be sufficient.

Maintenance department clean-up men may then carry out major cleaning tasks on glue rolls, case gluers, and heat-sealing units at the end of the day. Machine cleaners may also work during rest or lunch periods, or on staggered shifts, starting several hours later than the regular production crew.

4—Assigning Men to Lines

An influencing factor when deciding to assign maintenance and set-up men to a production line may be the size of the packaging operation. In some cases, maintenance workers, serving as mechanics and set-up men, may work with the production-line foreman. These men should, however, be under the supervision of the maintenance department.

Ideal arrangement for larger plants is to assign experienced set-up men to the faster lines. Skilled mechanics could be used on more complex equipment, shifting them when conditions warrant.

5—Maintenance Training

The need for training is fully recognized in many plants. And assistance from equipment firms will prove extremely helpful, especially upon the purchase of an advanced, highly mechanized machine. They could submit easy-to-understand, illustrated instruction manuals.

On-the-job training—working on machines with experienced men or under supervision as a mechanic's helper or oiler—is commonly practiced in some food plants. Here, training manuals generally are not employed.

Where seniority is not a problem, men usually are selected from lower rated jobs. And they don't have to take aptitude tests.

One company posts job openings, and selections are made according to qualifications. The men are then trained directly under the supervision of foremen.

6—Lubrication Program

Proper lubrication, charged to one man, plays a significant role in cutting down packaging-line breakdowns.

The lubing of machines should be the responsibility of the packaging or maintenance departments, preferably the latter. It's a good idea to have the engineering department specify types of lubricants to be used for new machines.

Look into the possibility of calling in representatives from oil companies. They will help set up a good lubrication program.

In carrying out the program, make certain that oiling and greasing jobs are scheduled and recorded for follow up. Use a card system here.

Equipment on high-speed lines generally is lubricated daily. Twice a week may be sufficient for slower lines, although certain major parts may require daily greasing. It is a good idea to oil all machines during week-ends or when they are not in use.

7—Making Change-Overs

A production-line change-over sequence involves removing parts from a machine and then cleaning, checking, and storing them.

Replacement parts should be kept in repair and ready for the next run. The task of sorting and assembling change parts should be carried out by maintenance set-up men. To avoid mix-ups, change parts should be properly indexed. And they should be stored in assigned spaces.

The commonly accepted method of gaging adjustments following a changeover is to run packages through the line.

Average rate of efficiency of packaging lines runs about 75 to 80 percent. In a specific case, this has been determined by automatic recorders. One firm allows a 10 percent downtime, using 90 as 100 percent line efficiency.

End (Resume reading on page 113)

WHAT IT TAKES TO CUT COSTS

—*Continued from page 99*

For size or container changes, some processors are calling for removable assembly units that can be quickly replaced. Since adjustments are permanently set, no time is lost in starting the machines. What's more, changes of this type could be made by the line operator.

In some cases, it may be easier to replace a part than to make an adjustment. For instance, label pickers on a machine can be replaced in a few seconds by removing a cap screw.

One firm believes that there may be a trend toward packing some of the more expensive foods in smaller containers as well as in present size. This would call for minimum changeover time—for machines that can be quickly adjusted during lunch or rest periods.

Importance of quick delivery of changeover parts is accented by another processor—particularly when the decision to switch to a different package hinges upon how long it takes to receive a changeover part.

To reduce inventories and obtain replacement parts faster, some processors are standardizing the types and makes of motors, safety clutches, gear reducers, brakes, electric controls, and other mechanisms on machines which they purchase.

Other processors seek electrical or pneumatic units that can be replaced in jig time.

Still others wish to change weight scales simply by manipulating a few screws.

To meet processors' needs, parts ought to be adjustable to compensate for wear, and bushings should be designed for easy replacement. Adjustments should be few and simple, and the various parts of the machine ought to be easy to get at.

Some firms with multiple packaging lines attain efficient performance through the use of standby units. When a breakdown occurs, the machine is replaced and repaired later. In the case of bread-wrapping machines, a spare unit on the line is put into operation when a machine runs out of wrapping paper.

End (Resume reading on page 101)

Packaging Special

ALERT MACHINE MAINTENANCE

—*Continued from page 116*

Let's assume that the top speed of a specific unit is 100 cycles per minute. And that even after everything possible has been done, the unit continues to be plagued by a 20 percent scrap output at that speed. Then the operator may, as a last resort, cut the rate to 90 cycles per minute—and may then find the scrap output reduced to but 10 percent.

When calculating production costs prior to purchasing a wrapping machine, it is dangerous to use a top operating speed without making trial runs.

There are no 'all-purpose' wrapping machines. Certain machines have wider ranges of size adjustments than others. It is folly to purchase a machine on the basis that, with a few minor changes, it can be adapted to do a job for which it was not originally designed. The wise purchaser with experience in wrapping machines and their maintenance will seriously consider spending more money for a unit designed to do a specific job.

This does not apply, however, to reasonable size changes within proper limits of the basic unit.

Care should be exercised in selecting a unit designed for easy cleaning and maintenance.

It is good practice to foresee the need of extra equipment, such as electric eyes, code-printing devices, and labeling mechanisms. In this case, the wise buyer purchases a basic machine designed to accommodate these extras. Where a range in sizes requires minimum and maximum adjustments of a unit, serious consideration should be given to the purchase of two units. One should handle the smaller sizes well within the adjustment range and the other should take the larger sizes. In this way, it is possible to make appreciable savings in change-over time by always having on hand an adequate supply of change parts.

Maintaining a single wrapping machine may be more aggravating than several units. This is because a processor with several units must set up a sizable maintenance crew whose only responsibilities are to keep them operating efficiently. On the other hand, a single unit requires the part-time services of a maintenance man.

In the first instance, the well-trained, fast-responding group acts as a team. But the trained mechanic-maintenance man usually has divided responsibilities, hence is slower to answer the call for his services, since he is likely working on another machine.

The ideal maintenance set-up for a large processor is a wrapping machine division, headed by a packaging engineer or highly trained supervisor whose only responsibilities are the maintenance of packaging equipment. This system permits specialized training of mechanics.

Certain basic knowledge is applicable to all units in the wrapping-machine group. It is best to assign men for lengthy periods to specific units and meanwhile have a "floating crew" to assist permanently assigned mechanics when the need arises.

Usually, one maintenance mechanic can take care of four wrapping machines. Over a period of time, he will work out a system of quickly checking a unit when called for repairs.

In some instances, four or more wrapping units handle the production from one manufacturing unit. The maintenance mechanic could then be put on the same wage incentive as the operators.

All wrapping units could be on wheels, with plug-in type of electrical connections. In event a machine requires a major overhauling, it is quickly replaced with a spare unit. In this way, there is minimum lost production, and the faulty unit can be repaired during regular working hours.

End (Resume reading on page 118)

MACHINE INNOVATIONS

—*Continued from page 109*

substituted for thin sections or intricate shapes.

Still another equipment manufacturer has found ductile iron a good substitute for bronze or aluminum because it provides a smooth finish to machine parts that marred containers.

Case-hardened steels are being employed for parts that must resist distortion and wear. From it, one firm is making gears and jaws on capping chucks. Other manufacturers are using it for cams and for nozzle guides on bottling machines.

4—SURE, EASY LUBRICATION TO REDUCE MAINTENANCE

Through application of more efficient lubricating techniques, particularly for high-speed equipment, machine maintenance and downtime are being greatly reduced.

Machines are completely oiled while in operation without accident hazards, regardless of the remoteness or inaccessibility of the bearings.

Various types of lubricators—automatic and semi-automatic—are available to meet specific needs. The mechanically-driven automatic lubricators are satisfactory for machines that have a large number of bearings or cams and require a large amount of oil. On the other hand, the semi-automatic (one-shot) lubricators are suitable for machines with comparatively few bearings or cams.

The automatic system comprises an oil reservoir and pump, together with small tubing from the lubricator to points to be oiled. Driven from the packaging machine, the pump delivers a measured amount of filtered oil through the tubing to metered units at the bearings. Each bearing then receives the required amount of oil.

The pump on a semi-automatic lubricator is manually operated at stated intervals by a push-back lever. This system, for example, lubes 26 bearings on a bottle filler and 22 on a labeler.

Some machines lend themselves to centralized lubrication. Others do not. For instance, a one-shot lubing system supplying oil to gears and main shafts might be satisfactory for a spot labeler. An oil-enclosed drive might be more suitable for the automatic carton feed on a 6-beer-can, carry-home packer.

Partially centralized lubrication may be employed where a complete system would be too costly—as for greasing motors on a line where the equipment is not completely arranged.

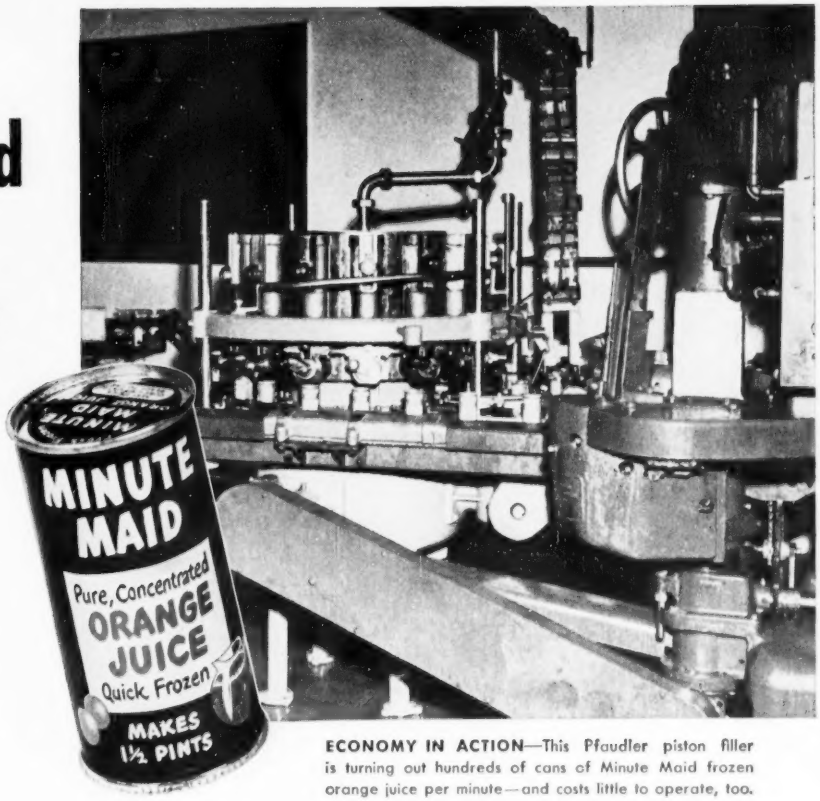
One processor has installed a centralized system for oiling 56 points on each of six machines. By merely pressing a button once a day, all 336 points are completely and easily oiled.

Even manual lubrication is being eased on new machines by means of grease-gun fittings that extend through machine frames and cover plates. These sometimes are grouped at one convenient point.

End (Resume reading on page 111)

Packaging Special

How High-speed Filling *Pays off* for MINUTE MAID



ECONOMY IN ACTION—This Pfaudler piston filler is turning out hundreds of cans of Minute Maid frozen orange juice per minute—and costs little to operate, too.

To keep pace with the demand for Minute Maid frozen orange juice, speed is an important factor in Minute Maid Corporation's packing operation.

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ACCURACY also helps to keep filling costs low at Minute Maid Corporation. On their Pfaudler fillers they can adjust the volume of each fill to within 1/10 of an ounce. This means uniform packaging—without spillage. And the possibility of wasted product is eliminated by Pfaudler's "no-can—no-fill" feature.

EASY CLEANING means lower maintenance costs. This is possible with Pfaudler fillers because the pistons and cut-off valves can be readily removed by hand—no tools are needed. And to assure longer life, there are no wrist pins or connecting rods to wear out.

Mail the coupon below for your copy of Bulletin 876, "Rotary Piston Fillers." It contains valuable information on how to reduce your filling costs.

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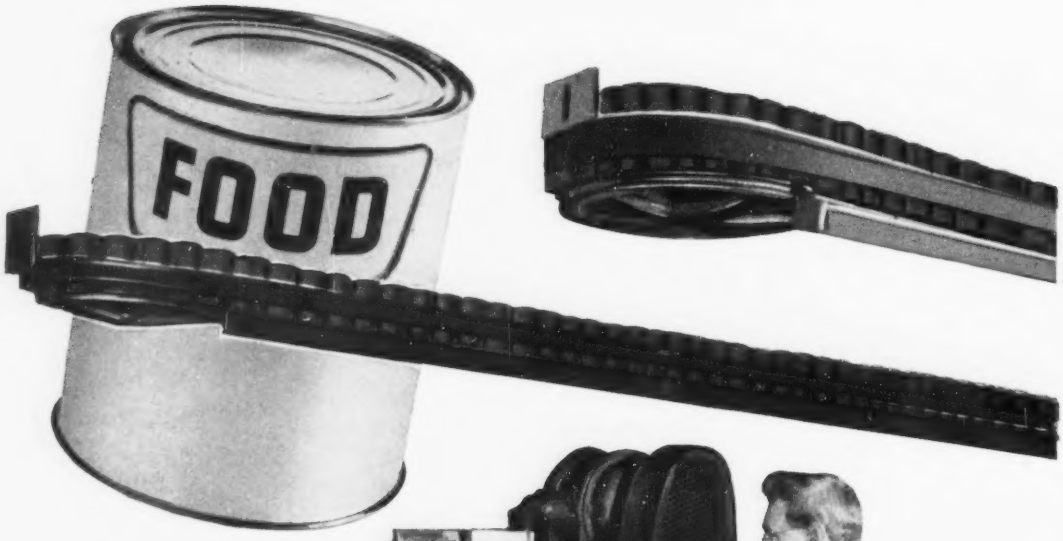

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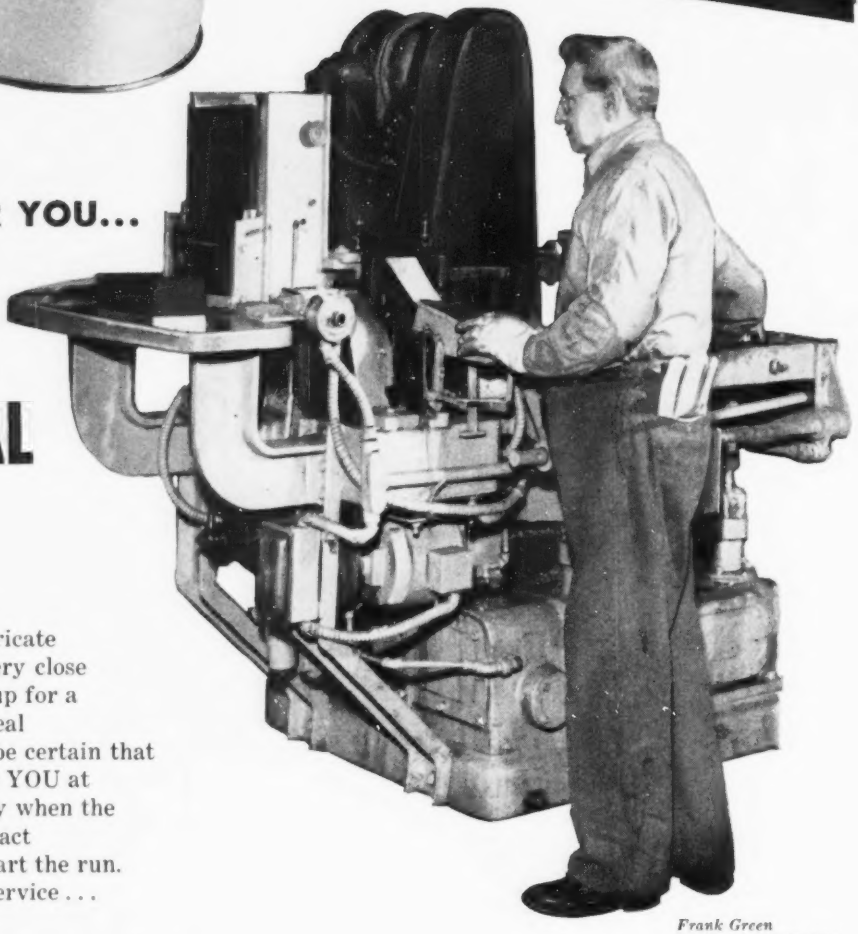

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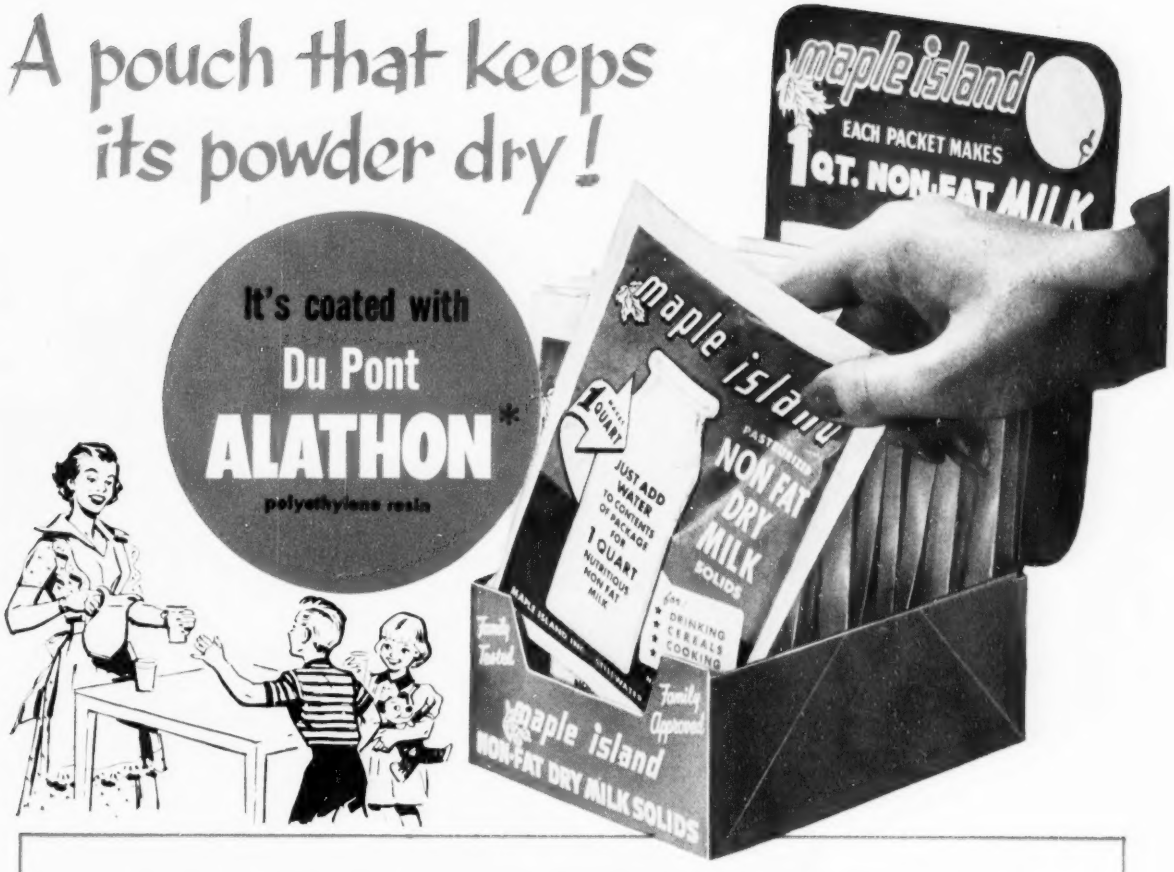

Coating of "Alathon," in single-service pouch bag for dry milk powder insures effective moisture barrier and leakproof heat seal.

Developing a single-service pouch bag for dry milk powder involved solving two important problems. First, the pouch bag had to be an effective moisture barrier—or the powder would cake. Second, the heat seal had to be strong and permanent, even though powder "dusts" into the seams.

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Many packagers are finding coatings of "Alathon" helpful in solving their problems. "Alathon" is flexible at low temperatures. It's tough, strong, resists most greases, acids and alkalies. Perhaps "Alathon"—with its unique combination of properties—can help you solve a packaging problem. Consider using it in multi-ply, duplex or single-ply bags, pouch bags, chipboard containers and trays, fiber drums and cartons.

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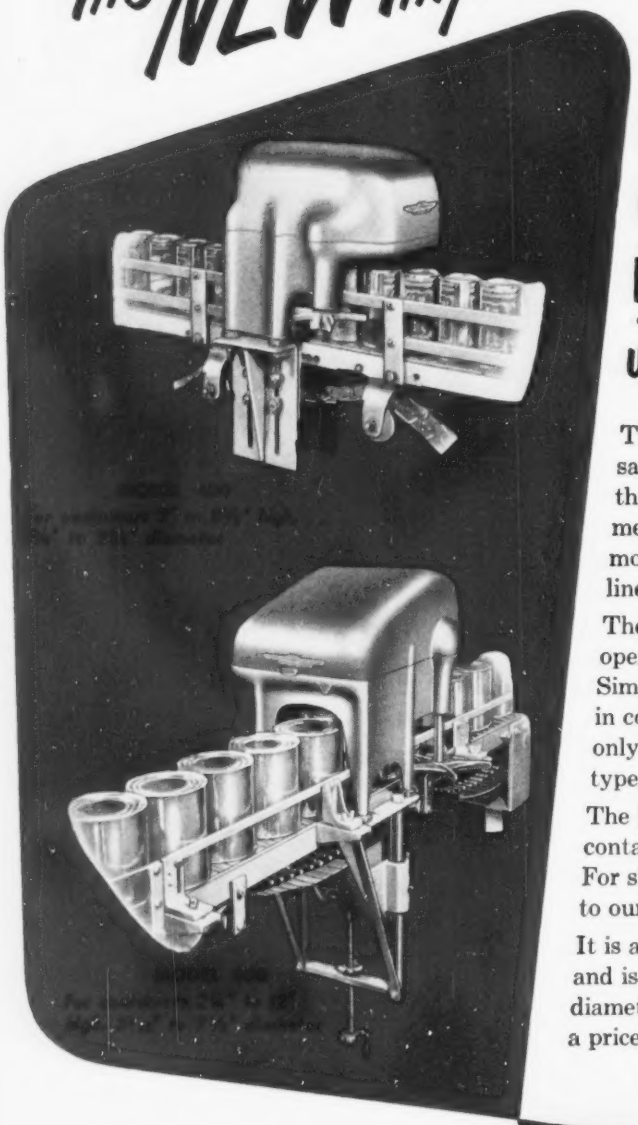

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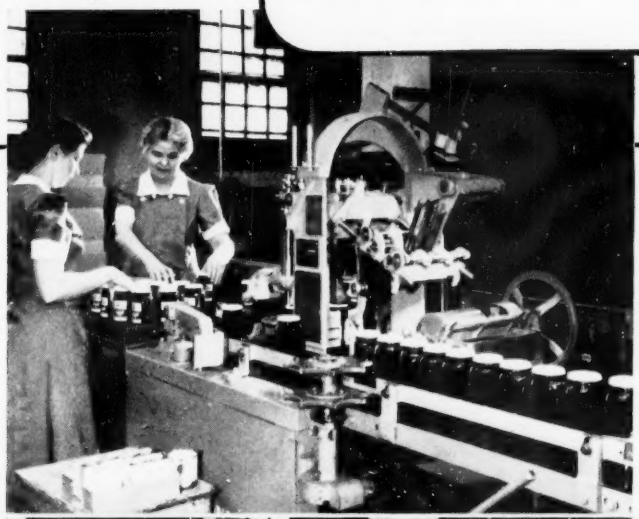

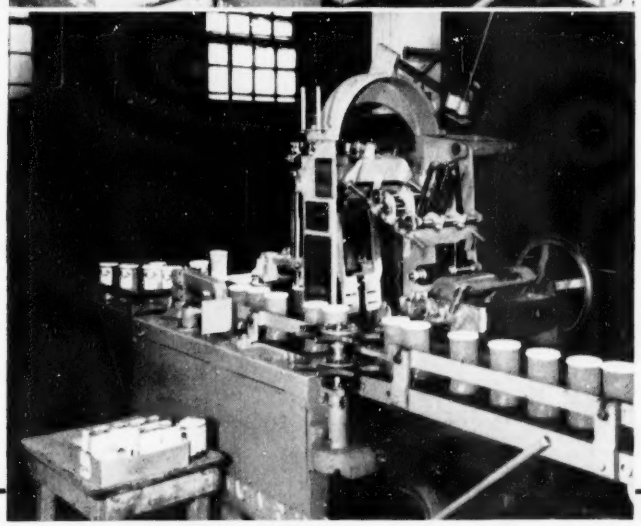

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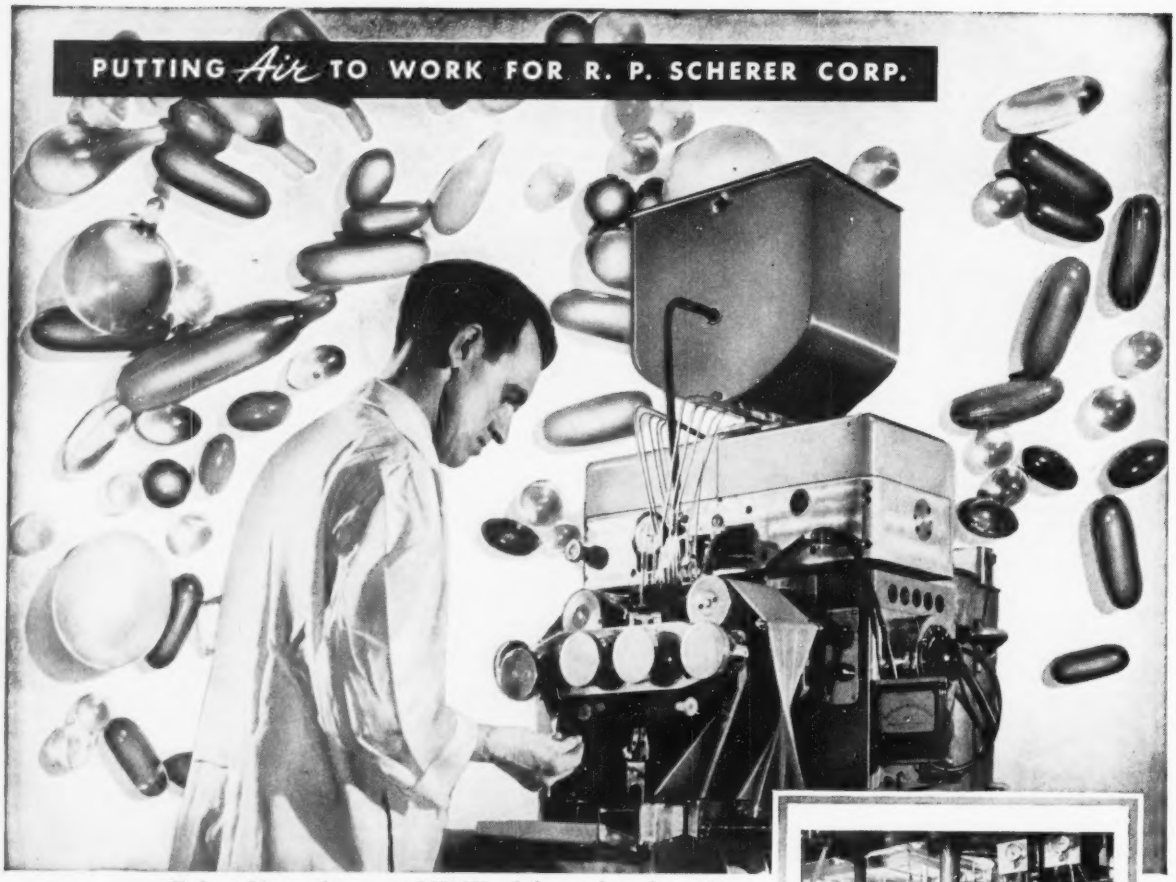

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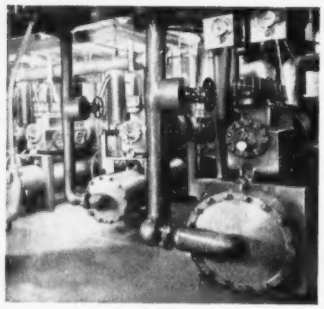
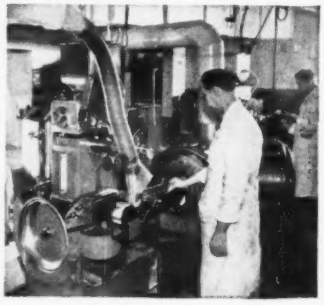


Heads, end bells and side plates have not once been removed since installation in 1942 despite a continuous service record totalling 54,000 hours.



Controlled air supplied to each capsulating machine insures the absolute uniformity of product that is required.

YOU CAN BE SURE... IF IT'S

Westinghouse

AIR CONDITIONING

J-80253

Schoettle Case Histories:

true story of a

Purchasing Agent in a Tight Squeeze

CASE HISTORY #78 Here's one where the whole office ganged up to put the Purchasing Agent in a tight squeeze: Customer* had to get a packaged spotlight on the market quick . . . competition was already out and our customer had to have a smart new package . . . Sales Department had been slow, now wanted all kinds of speed . . . management was yelling for boxes . . . Such an order, at top speed, usually takes 6 to 8 weeks. We pulled the PA out of the tight squeeze by delivering in 3 weeks, *from scratch!*

CASE HISTORY #88 Our customer* (a large food chain), ordered new cake boxes. No hurry. Plenty of time. Then, suddenly, Purchasing Agent yelled he was in a tight squeeze: must have order completed on original date—but greatly increased quantity . . . Schoettle mill connections and facilities went to work . . . brought the full quantity to the customer right on time!

Schoettle can often do the "impossible" because of unusually excellent facilities and resources, the kind of cooperation that clicks on behalf of a customer who finds himself in a tight squeeze for quality boxes—fast! It will pay you to look into Schoettle service . . . it's saved many a Purchasing Agent many a grey hair!

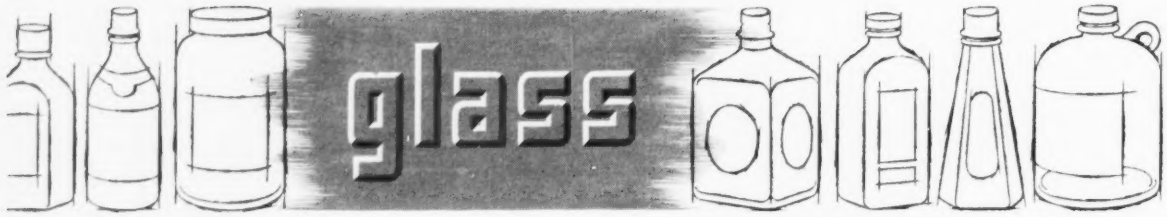
*name on request

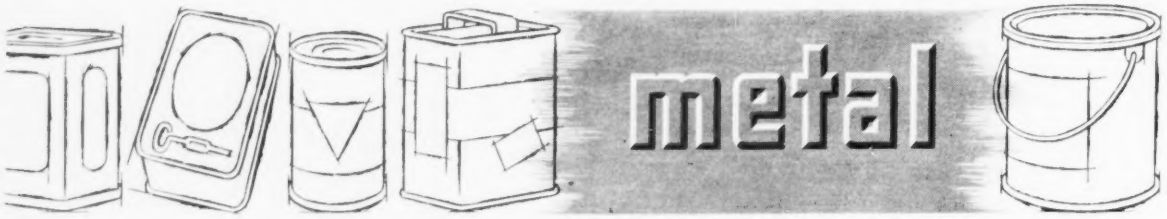
EDWIN J. SCHOETTLE CO.

533 NORTH ELEVENTH STREET • PHILADELPHIA 23, PENNA.

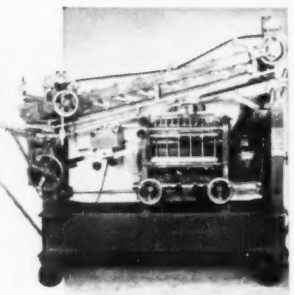
Designers and Manufacturers of Paper Boxes with Buy Appeal

For more information, use coupon on page 213.





packaging IS A $7,000,000,000 A YEAR INDUSTRY



New Way Model E5 Labeler with deep label bed and continuous feed — made by Chisholm-Ryder Co.

Containers of glass, of metal, of paper—machines to make, fill, label or wrap them—labels, wrappers and adhesives . . . put them together and you have a $7,000,000,000 Packaging Industry.

Packaging is one of a hundred industries in which Arabol is privileged to serve the leaders. Out of 68 years of pioneering, ten thousand adhesives formulas have been developed in our five laboratories. Arabol Adhesives are now supplied for more than a thousand end uses.

Somewhere in your business, adhesives are required—in the making of your product, in its labeling, packaging and/or shipping cases.

Somewhere near your business there is an Arabol plant or warehouse ready to serve you.

We invite the opportunity to submit adhesives samples for you to test in your own plant—under your particular working conditions—for your specific requirements, whatever their nature. That is the one kind of testing that assures you of satisfactory results. Your inquiry to Department 75 will bring a prompt response.

Adhesives? **ARABOL!**

68 Years of Pioneering

THE **ARABOL** MANUFACTURING CO. . . . *a nationwide organization serving major users of industrial adhesives*

EXECUTIVE OFFICES: 110 E. 42nd ST., NEW YORK 17, N. Y. • CHICAGO • SAN FRANCISCO • LOS ANGELES • ST. LOUIS • ATLANTA • PHILADELPHIA • BOSTON • PORTLAND, ORE. • ITASCA, TEX. • LONDON, ENG.

Speed Production, Retain Freshness...

with this heat-sealing coat of **Vinylite** BRAND resins

Data courtesy
Riegel Paper Corporation,
260 Madison Ave.,
New York, N. Y.

Take a smooth, snow-white, long-fiber paper. Give it a coating of VINYLITE Brand Resins, and you've got the makings of a first-class food package.

It heat-seals at the rate of 3,000 or more an hour. The VINYLITE Resins form a bond that holds fast—yet the consumer can tear it open without difficulty. The coating gives the paper a fine, glossy finish, enhances printing and colors, helps keep flavor and aroma inside the package.

Essentially odorless and tasteless themselves, coatings of VINYLITE Brand Resins are resistant to moisture, alcohol, temperature change, most acids, alkalies, and oils. They're tough and pliable—stick fast even where paper is creased. They add strength—reduce breaking and tearing. They won't discolor or deteriorate in contact with foods.

Besides providing a heat-seal for paper and foil, VINYLITE Brand Resins are used to line cans, drums, and closures. They offer you the properties of the VINYLITE Resins and Plastics that are used so widely throughout defense and industry. Write to Dept. PT-74 for further information on the role of VINYLITE and BAKELITE resins and plastics in the field of packaging.

BE SURE TO VISIT BAKELITE'S EXHIBIT, BOOTH 109-111.
NATIONAL PACKAGING EXPOSITION, CHICAGO, APRIL 20-23.

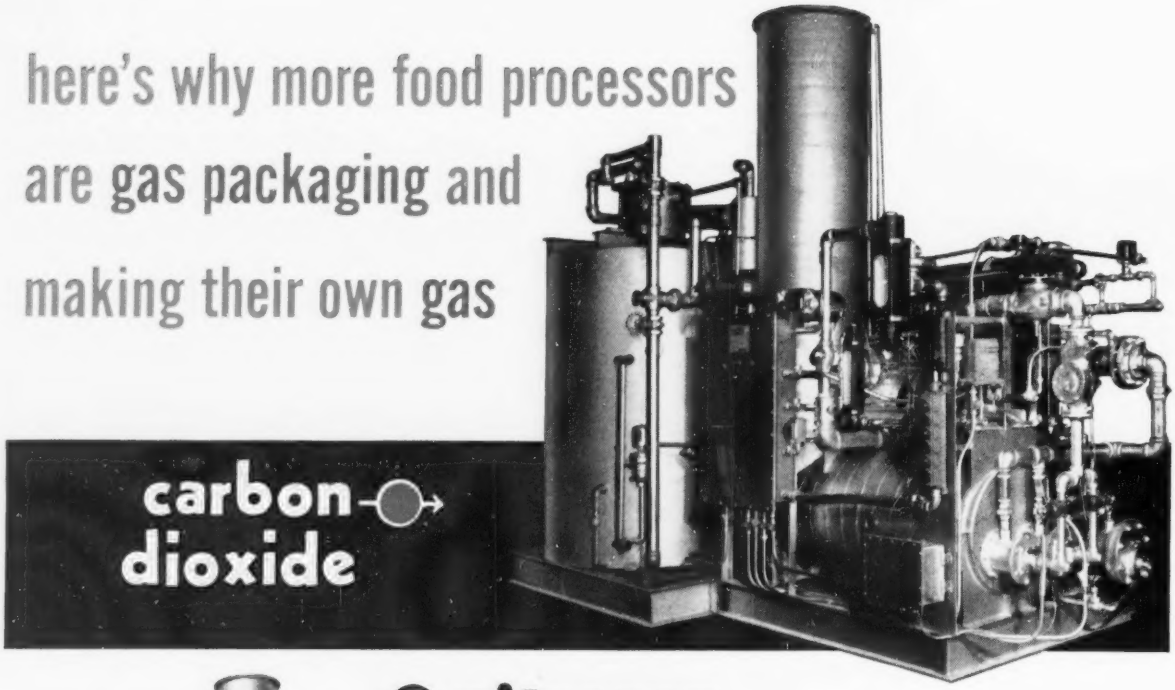
Vinylite BRAND
RESINS

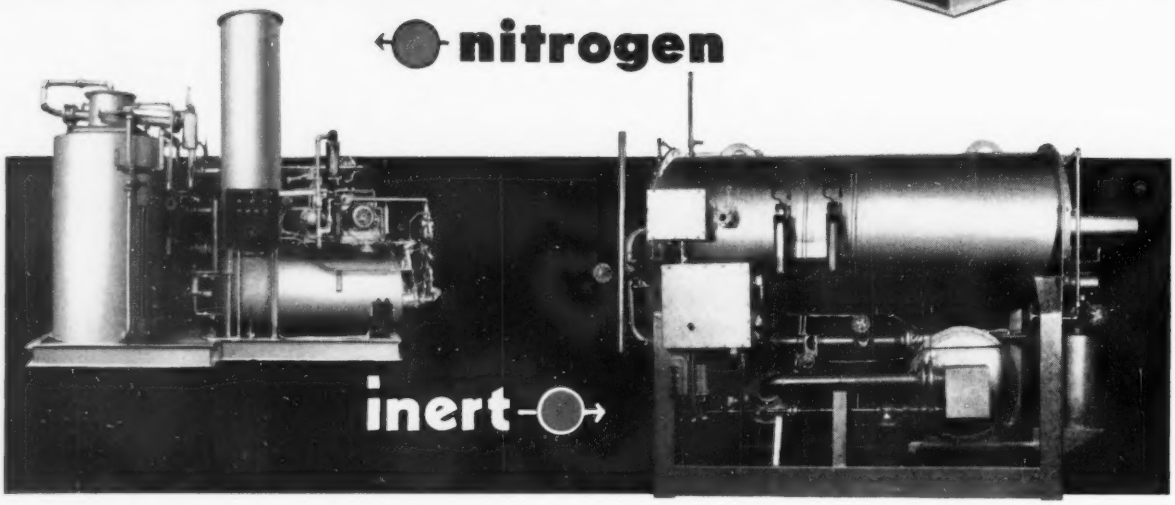
TRADE MARK

BAKELITE COMPANY
A Division of
Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York 17, N.Y.

For more information, use coupon on page 213

here's why more food processors are gas packaging and making their own gas





Solid investments that pay for themselves in two years or less — that's what food packaging people who have installed Gas Atmospheres' gas generating equipment have to say about these compact, money-saving units.

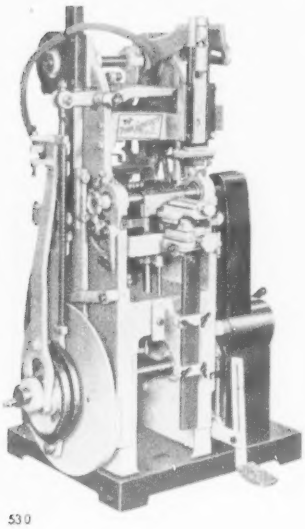
If you now use carbon dioxide, nitrogen, or inert gases in the manufacture or packaging of your product, or are considering adapting this modern method to your operation, it will pay you to find out what we mean when we say that — if you use gas, in any amounts at all, Gas Atmospheres can show you, with your own figures, how you can save the cost of the equipment in two years or less, and from that point on have the most inexpensive gas supply available.

Get the facts. Write today. Let us know the amounts and type of gas you use and we'll be glad to show you why last year more food packaging people purchased Gas Atmospheres equipment than ever before.

gas Atmospheres, inc

equipment for producing industrial gases

20005 WEST LAKE ROAD CLEVELAND 16, OHIO



530

HOW? By utilizing *vacuum* in a critical stage of your packaging.

All the care lavished on selecting appropriate containers, perfect closures and attractive labels for carefully made products,—the components that reflect Quality, can be nullified by neglecting precision labeling.

When your product meets the eye of the buyer, every label should be exactly in its proper position,—in intimate *permanent* contact with its container. This is *mechanically assured* by use of vacuum to do the label-handling, guaranteeing positive label-feeding, uniform adhesion and accurate label placement.

To do this, you need a PONY LABELRITE®

Why not ask for proof?

NEW JERSEY MACHINE Corporation

AUTOMATIC LABELING • PACKAGING — PAPER BOX MACHINERY • MAKERS OF THE PONY LABELRITE

FACTORY SALES AND SERVICE BRANCHES
325 W. HURON ST., CHICAGO 10, ILL.
1701 CAREW TOWER, CINCINNATI 2, OHIO
2500 W. 6TH ST., LOS ANGELES 5, CAL.

MAIN OFFICE & FACTORY: 1552 WILLOW AVENUE, HOBOKEN, N. J.

 For more information, use coupon on page 213.

CANCO

To the rescue... 25,000 times!

The Canco technical man is a very important person in your business.

No matter where your plants are located, you can rely on him to call *promptly* when you need him.

Day after day, Canco's trouble-shooters not only devote their energies to production line difficulties and to improving crop yields, but to suggesting new formulas and products . . . to supervising new installations . . . and to maintaining and increasing production.

During 1952, Canco technical men made more than 25,000 such calls on Canco customers.

If you do business with Canco, you know the value of this constant, conscientious technical service. If not, isn't it time you, too, added these superior services to your own?

Go first to the people who are first!

AMERICAN CAN COMPANY

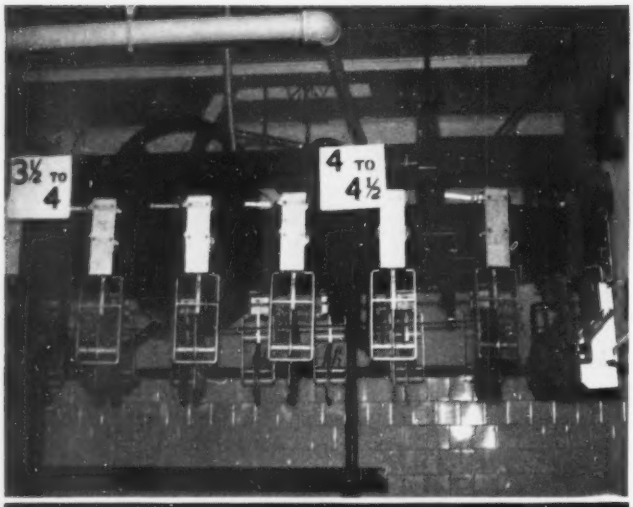
CANCO

New York, Chicago, San Francisco; Hamilton, Canada

The Sanitary can—perfected by Canco—made commercial canning of fruits and vegetables possible; revolutionized the grocery business; helped raise the national level of nutrition and health.

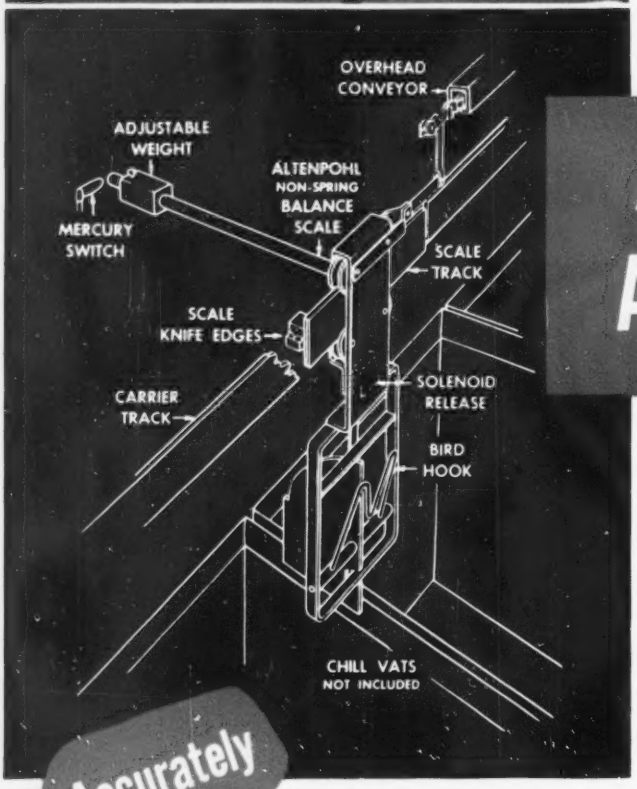
Through the years, constant Canco pioneering and cooperation with the canning industry have brought forth widespread process and product improvement—opening new markets for canned foods of all kinds.

 For more information, use coupon on page 213.



here it is!

a new, proved way to completely take the "Guess" out of sizing...



This line drawing shows the principle of the ALTENPOHL SIZER. *The product (in this instance a bird) is hung on moving carriers. When the carrier reaches a scale, the product is automatically weighed. Those of uniform weight are released by the scale balance beam closing a mercury switch which energizes a solenoid.*

Accurately Sizes Any Product

ALTENPOHL Automatic Sizer

Sizing your product automatically with the ALTENPOHL SIZER assures you many savings. No longer need you pay the penalties of manual sorting—the inaccuracies of spring balances—the "guess" that takes the place of waiting for the pointer to stop.

ALTENPOHL'S SIZER gives you uniform, accurate weights within half an ounce. It is approximately 4 feet wide, its lengths dependent upon the number of weighing stations, one of which is required for each different weight designation. Each scale is quickly adjusted for any weight up to 7 pounds, even while the machine is running.

Other advantages of this ALTENPOHL SIZER are its rugged and trouble-free operation, low maintenance, cleanliness, and satisfaction guaranteed. Experienced factory personnel install each ALTENPOHL SIZER.

FOR FULL DETAILS, WRITE US TODAY

W. F. ALTENPOHL, INC.

4041 RIDGE AVENUE

PHILADELPHIA 29, PA.

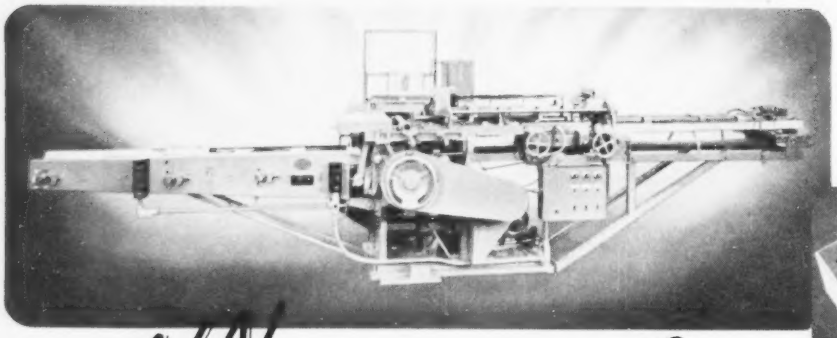
Stock Vignettes

Highest Quality - Lowest Cost

WESTERN WAXED PAPER DIVISION
CROWN ZELLERBACH CORPORATION
SAN LEANDRO & LOS ANGELES, CALIFORNIA • PORTLAND, OREGON

Originators of Full Color Stock Designs

for Frozen Fruits · Vegetables · Sea Food · Chicken



AGAIN "PACKAGE" MEETS THE CALL FOR HIGHER SPEED

Once again the Package Machinery Company's unparalleled experience in building high-speed wrapping machinery pays off. This time in the frozen food field . . . The new machine illustrated turns out 160 perfectly wrapped packages a minute.

The Model FF-H offers advantages never before available in a frozen food wrapper. The machine's radically new method of feeding the wrapping material assures perfectly registered wraps at highest speeds. Its basic design is such that loads are uniform throughout the entire wrapping cycle, resulting in smoother operation, longer life. And new features such as its automatic carton feeder, counterbalanced lift-up assembly, centralized electrical controls, etc., result in highest operating efficiency and a reduction in shut-down time.

Leading frozen food packers placed orders for this new machine just as soon as they learned what it offered.

Let us help YOU package better

Our machines are used in every field where products are packaged. They embrace not only wrapping machines, but carton forming and closing equipment, bag-making-and-filling machinery, etc.

A representative from our nearest office will be glad to work with you in an effort to give you better packaging at lower cost.

Write or phone today

•

See us at the
Packaging Show
Booth 103, Navy Pier, Chicago
April 20-23

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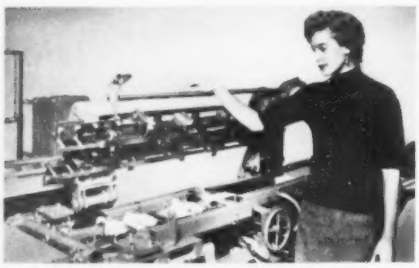

Counterbalanced "Lift-up" transport assembly

exposes entire top package level of machine. Operator can set by eye, as well as by feel, the tucker assembly, folding boxes, heater unit and belt discharge. Materially reduces shut-down time for cleaning.

PACKAGE MACHINERY COMPANY

WRAPPING DIVISION
SPRINGFIELD, MASSACHUSETTS

NEW YORK · CHICAGO · BOSTON · CLEVELAND
ATLANTA · DALLAS · DENVER · LOS ANGELES
SAN FRANCISCO · SEATTLE · TORONTO · MEXICO, D. F.

BORDEN'S famous family of cheese products uses Nashua's PERVENAC Dry-Labeling Paper to assure a clean, permanent labeling job.

for that
taste of sales success

USE PERVENAC*
Dry Labeling Paper

You eliminate glue with this Dry-Labeling method. You eliminate the problems of glue-handling, eliminate "bubbles" under the labels and the messy job of cleaning glue from machines.

PERVENAC Dry-Labeling Paper gives you a cleanly-labeled product. No adhesive smears, fewer rejects and less re-labeling. Many plants report great production increases in number of units labeled per hour.

Used on glass, metal, paperboard or film, PERVENAC is ideal for most food labeling jobs. Write for a copy of Nashua's booklet on "Label Impact." Do it today, at no obligation.

*Registered trademark. Manufactured under Patent No. 2,462,029

NASHUA CORPORATION
NASHUA, NEW HAMPSHIRE

NASHUA

Everything in Flexible Packaging that Sells

DESIGN / PRODUCTION

PRINTED FILM • WAXED WRAPPERS • BOX PAPERS • BOX STAYS
GUMMED PAPERS • HEAT SEAL PAPERS • FLOCKED PRODUCTS • PARTY PAPERS • PRINTED BANDS • CORRUGATOR'S TAPE • SEALING TAPE
MOISTENING MACHINES • TECHNICAL PAPER PRODUCTS

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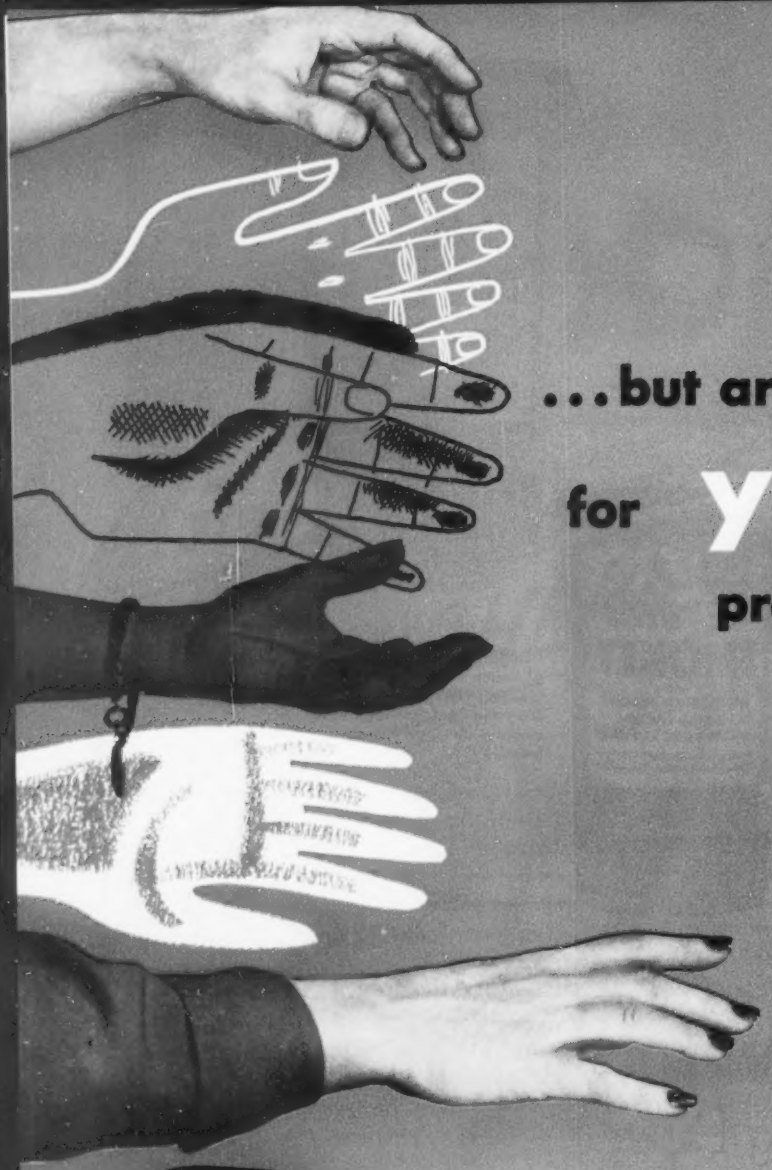


...but are they reaching for your products?

Fibre Cans

Folding Cartons

It depends upon the package—in these self-service days! And that's why so many food manufacturers depend on Ritchie. They know that Ritchie packages are styled to catch the shopper's eye, and start her hand a-reaching. They know, too, that Ritchie packages are practical—that they pack and stack and protect what's in them. Don't you want to talk to Ritchie? It will get more people reaching for *your* products!

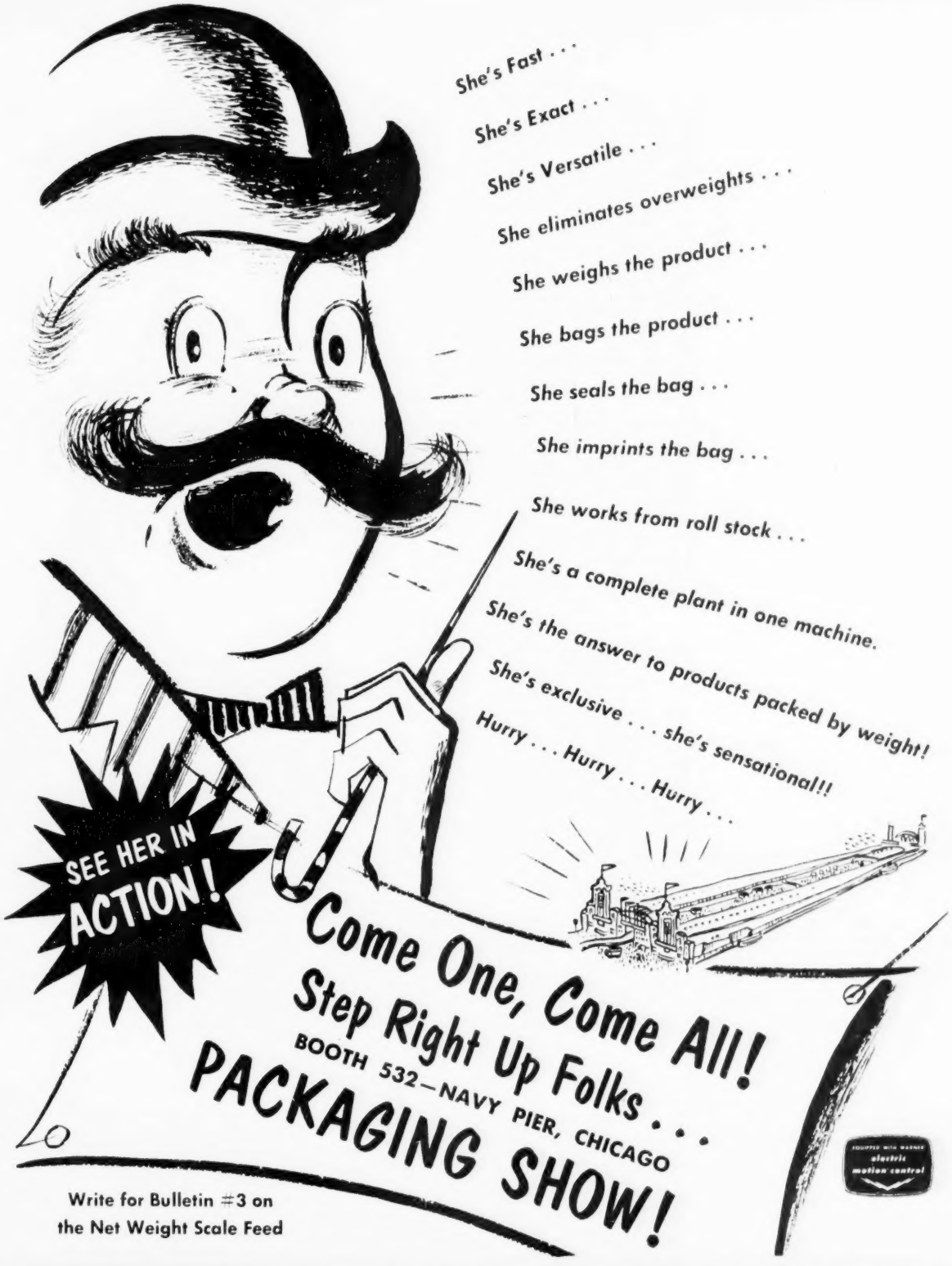
HAND YOUR PACKAGING PROBLEM TO W. C. *Ritchie* AND COMPANY

8834 Baltimore Ave., Chicago 17

New York, Los Angeles, Detroit, Dallas, Denver, Providence, St. Louis, Cleveland, Seattle, Jacksonville.

SEND FOR THIS VALUABLE FREE BOOK!

"101 Ways to Get Better Packaging"—it's yours for the asking. Also gives complete information on Ritchie's broad service and line: Folding Cartons, Set-up Boxes, Fibre Cans, Transparent Packages, Paper Spools, Tubes, Cores, Point-of-Purchase Displays and Dispensers. Write today!


She's Fast . . .
She's Exact . . .
She's Versatile . . .
She eliminates overweights . . .
She weighs the product . . .
She bags the product . . .
She seals the bag . . .
She imprints the bag . . .
She works from roll stock . . .
She's a complete plant in one machine.
She's the answer to products packed by weight!
She's exclusive . . . she's sensational!!
Hurry . . . Hurry . . . Hurry . . .
SEE HER IN ACTION!
Come One, Come All!
Step Right Up Folks . . .
BOOTH 532—NAVY PIER, CHICAGO
PACKAGING SHOW!
Write for Bulletin #3 on the Net Weight Scale Feed
electric motion control

TRANSPARENT WRAP MACHINE CORPORATION

ROUTE 17 HASBROUCK HEIGHTS NEW JERSEY

"Originators of Completely Automatic Packaging"

Agents in Principal Centers of U.S., Canada, Mexico and South America

 For more information, use coupon on page 213.

The

new

WEIGHING WONDER

of this day and age...

REVOLUTIONARY PRESSURE PRINCIPLE

NOW — for the first time — PNEUMATRON makes available instantaneous pressure weighing — the result of many years of research and cumulative experience.

The Pneumatron weighing head has a highly responsive, continuously balanced cantilever assembly which moves only a *few thousandths of an inch* during the weighing operation. An air control device measures this deflection in millionths of an inch — while weighing within *hundredths of an ounce*. The result in performance like this —

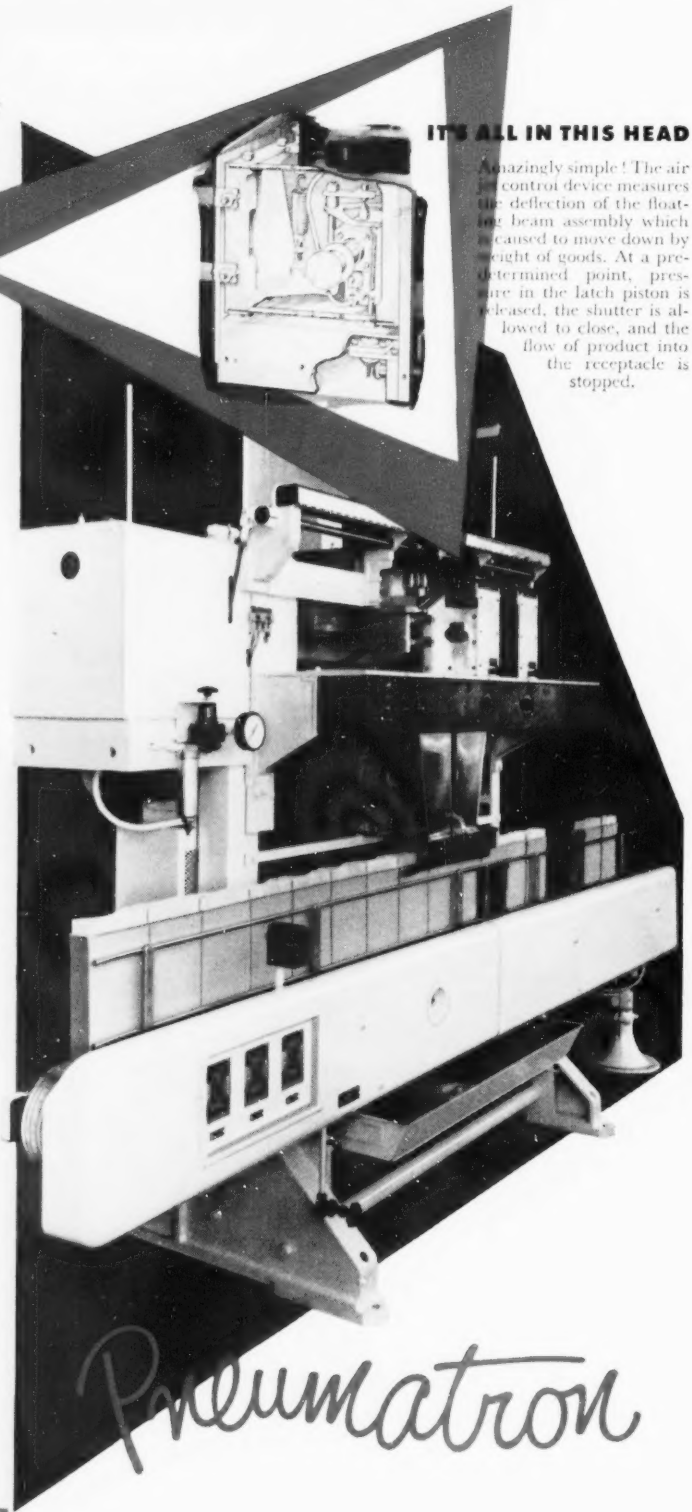
SPEED — More than twice as fast, two head units may be used to do the work previously done by four.

ACCURACY — Compared to conventional methods Pneumatron's phenominal accuracy and reliability keeps overweight "give-away" to a negligible minimum, thereby saving thousands of dollars per year.

CONSISTENCY — Weights hold to the line day in and day out — repeated adjustments are unnecessary, just set the heads once and forget them!

SIMPLICITY — No electronics or delicate trip mechanisms.

That, in brief, is Pneumatron. For further details on speed, floor plans, weight accuracy charts and overall performance, send for Bulletin 122. PNEUMATIC SCALE CORPORATION, LTD., 91 Newport Avenue, Quincy 71, Mass. *Also: New York; Chicago; San Francisco; Los Angeles; Seattle; Leeds, England.*



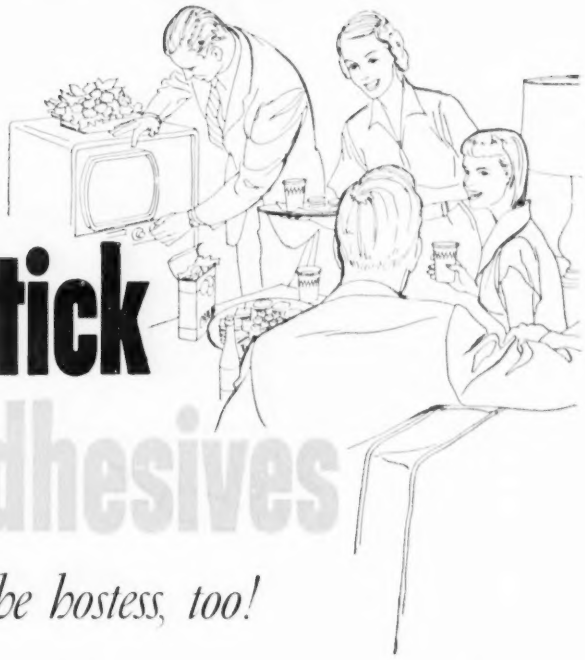
IT'S ALL IN THIS HEAD

Amazingly simple! The air jet control device measures the deflection of the floating beam assembly which is caused to move down by weight of goods. At a predetermined point, pressure in the latch piston is released, the shutter is allowed to close, and the flow of product into the receptacle is stopped.

Pneumatron

★PNEUMATIC

Packaging and Bottling Equipment



It's smart to stick with Swift's Adhesives

They serve you and the hostess, too!

As in other fields, Swift's Adhesives are used by many of the manufacturers who produce for the millions and millions of America's housewives—at work and at play. Swift's varied line includes adhesives for fabricating and sealing food and candy packages . . . for labeling bottles and jars . . . for these applications and many more.

When you need adhesives, always remember —

- Swift has years of specialized experience in adhesives production.
- Swift works with a broad range of quality raw materials.
- Swift has extensive adhesive manufacturing facilities from coast to coast.

A special adhesive for bottlers:

Swift's Evertite labeling adhesive . . . Semi-Iceproof—Designed for use on cold, wet, stippled or even slightly greasy bottles. We believe your tests will show it to be a clean machining, economical adhesive.

Swift's Evertite is used for labeling all these quality products of Crosse & Blackwell Co., Baltimore, Md. . . . assures a tight, neat seal . . . promotes an attractive appearance that helps sell the housewife.

Call **SWIFT** first for **ADHESIVES**

Swift & Company
Adhesive Products Department
Chicago 9, Illinois

This offer expires May 31, 1953

Please send your 10-gallon introductory trial shipment of Evertite, semi-iceproof adhesive, at the quantity price, to be tested for use in our operations. We understand, if not fully satisfactory, it may be returned for credit at your expense.

Name _____ *Title* _____

Firm Name _____

Address _____

City _____ *Zone* _____ *State* _____

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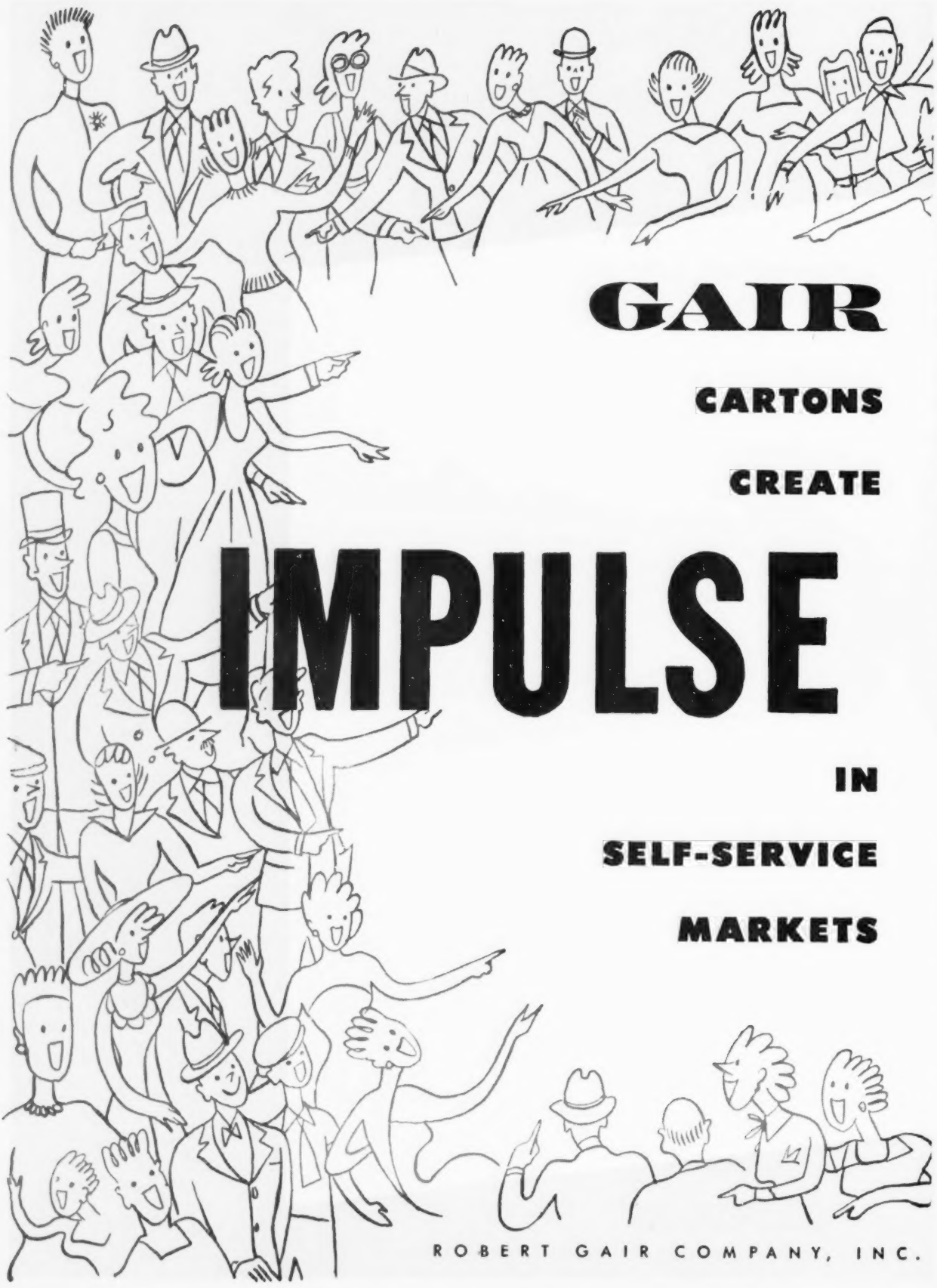
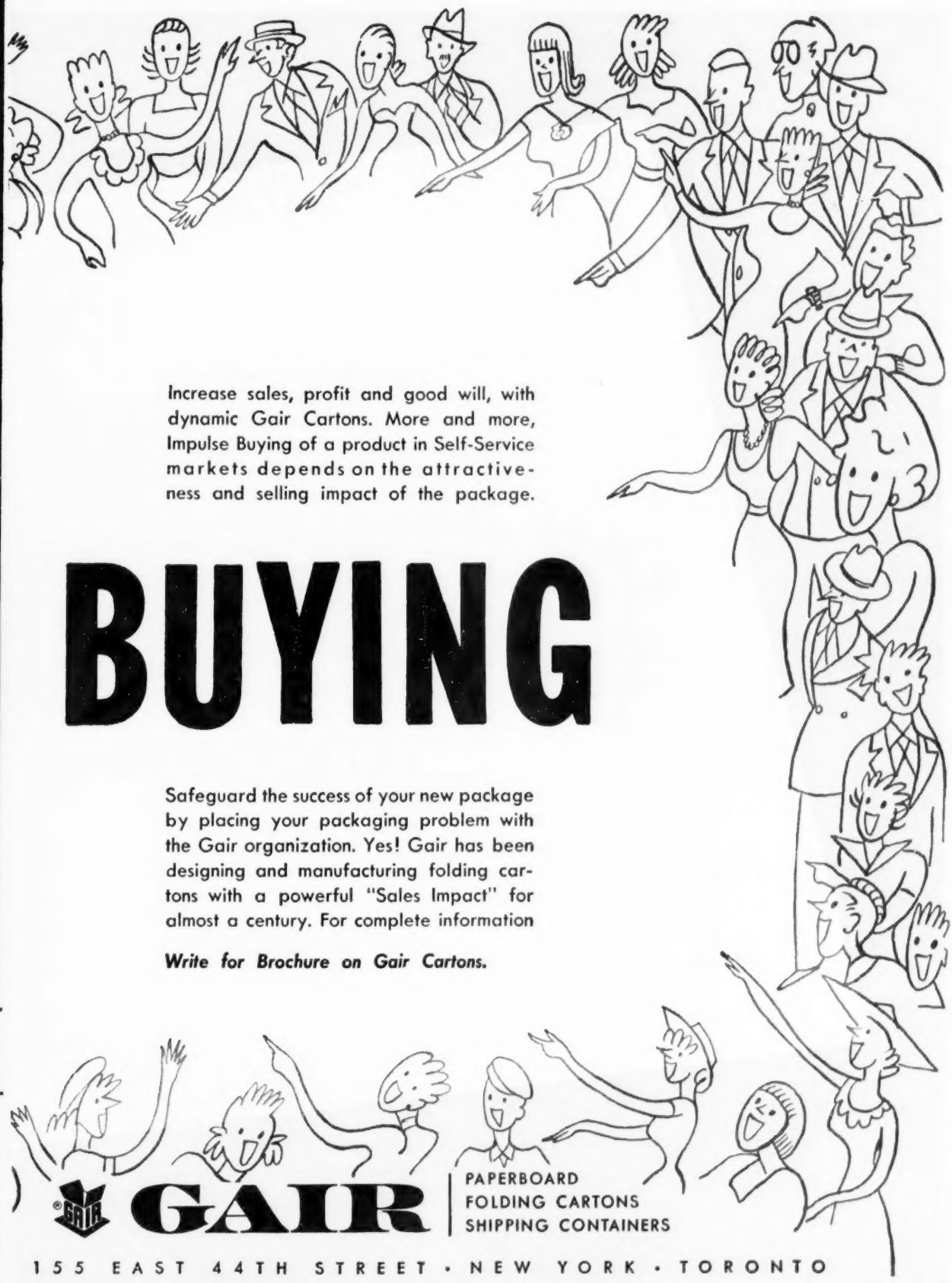


GAIR

CARTONS CREATE IMPULSE IN SELF-SERVICE MARKETS

ROBERT GAIR COMPANY, INC.



Increase sales, profit and good will, with dynamic Gair Cartons. More and more, Impulse Buying of a product in Self-Service markets depends on the attractiveness and selling impact of the package.

BUYING

Safeguard the success of your new package by placing your packaging problem with the Gair organization. Yes! Gair has been designing and manufacturing folding cartons with a powerful "Sales Impact" for almost a century. For complete information

Write for Brochure on Gair Cartons.

GAIR

PAPERBOARD
FOLDING CARTONS
SHIPPING CONTAINERS

155 EAST 44TH STREET • NEW YORK • TORONTO

 For more information, use coupon on page 213.

Look us up at the SHOW

SCANDIA

Manufacturers of Better Packaging Machinery

NORTH ARLINGTON, N. J.

BUNDLING • BANDING • MULTIPLE WRAPPING • HIGH SPEED WRAPPING

For more information, use coupon on page 213.

AMERICAN MANAGEMENT ASSOCIATION
TWENTY-SECOND
national packaging exposition
APRIL 20-23 1953
NAVY PIER · CHICAGO
Booth 652

LAMINATES
FOIL TO PAPER
PAPER TO PAPER
METAL TO WOOD

GLASS CONTAINERS
GLUES FOR WATERPROOF LABELING, CAP, LINERS CLOSURES

SHIPPING CASES AND LINERS
SOLID AND CORRUGATED FIBRE, CASE SEALING, WET-STRENGTH SEAMS

GET THIS Rx SERVICE WITH
Borden's PACKAGING GLUES

• Our glue "doctors" have many bases to work with . . . *vegetable, animal, casein, latex* and *resins* . . .

Call on us to prescribe the best glue at lowest cost for your *next* packaging problem, whatever it is: better machineability, *more or less penetration,* faster speed of set, *higher dry strength* or water-resistance, *better aging properties,* less toxicity!

Remember, just call *Borden's.*

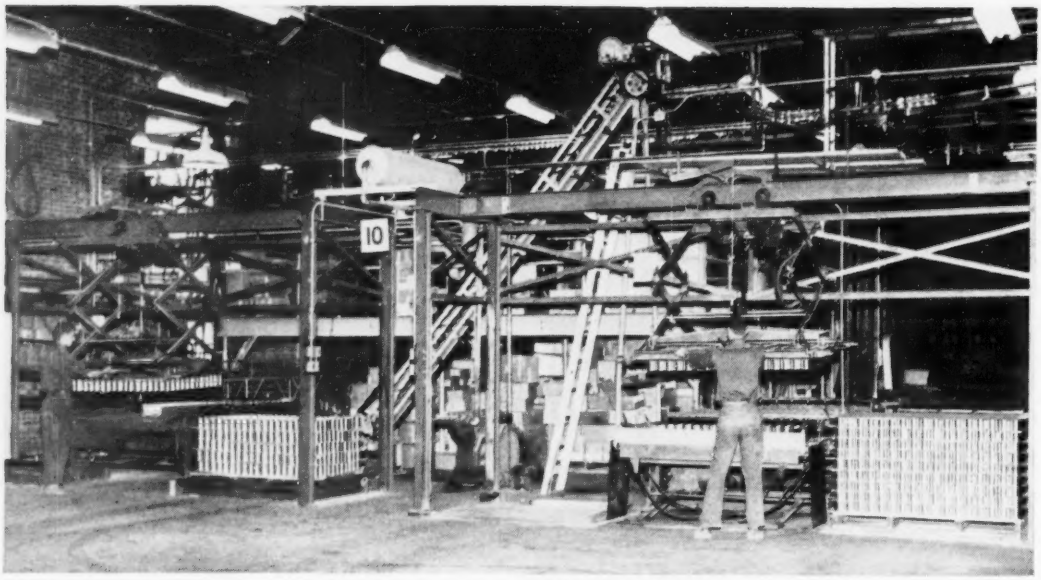
The Borden Co. Chemical Division, 350 Madison Avenue, New York 17, N. Y.

FOLDING CARTONS
SIDE SEAMING, WINDOW GLUING
Schlitz 6 CANS
Borden's

SPIRAL AND CONVOLUTE WOUND CONTAINERS
WATER-RESISTANT, HIGH-SPEED WINDING GLUES

PAPER BAGS
LAMINATING SIDE SEAMS, BOTTOM SEAMS, WET-STRENGTH RESINS FOR PAPER.
WESTERN GROWN
POTATOES

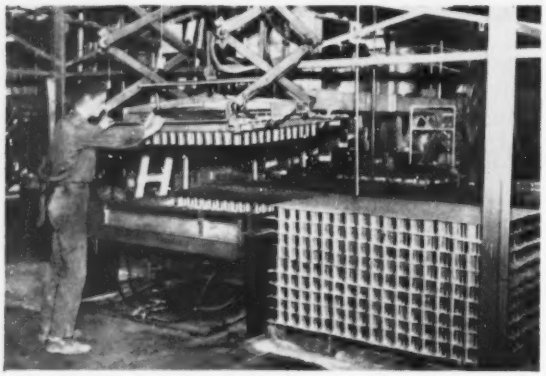
 For more information, use coupon on page 213.



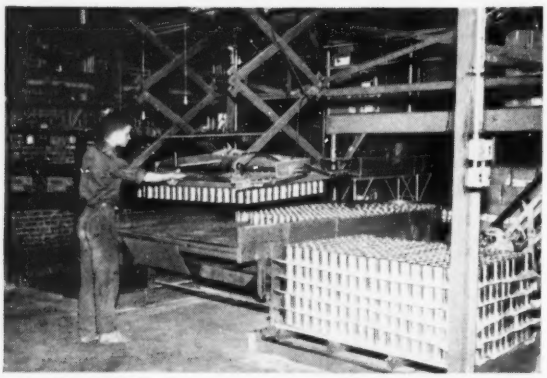
STANDARD-KNAPP bright can palletizing and de-palletizing unit in large U. S. food canning plant. Cans are palletized at high speed after cooling by equipment at right and de-palletized after storage for labeling on unit at left.

LEADING CANNER MECHANIZES BRIGHT CAN PALLETIZING

STANDARD-KNAPP EQUIPMENT PALLETIZES 600 CANS PER MINUTE...DE-PALLETIZES 1200 CANS PER MINUTE



PALLETIZING suction head, equipped with vacuum cups, picks up full layer of cans. Layer is then gently deposited on pallet. Can tiers are separated by kraft paper sheets which bind load together and limit "leaker" spoilage. Operator controls lifting and releasing by means of push buttons.

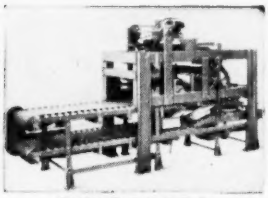


DE-PALLETIZING unit's vacuum cups remove layer of cans from pallet. Operator swings load gently onto a Standard-Knapp unscrambler, which delivers cans in single file to a booster for conveying to a labeler.

Compare your present bright can handling method with the Standard-Knapp system: One operator palletizes 600 cans per minute, easily, without laborious effort. A second operator de-palletizes them for labeling at a rate of 1200 cans per minute, again working easily. You get more cans in a given space, because the kraft liners take much less room than wooden separators. Leaker damage is not only strictly confined, but leakers can be readily detected and removed during de-palletizing.

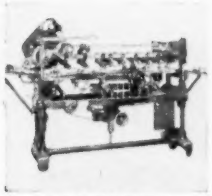
Right Down The Line...STANDARDIZE With STANDARD-KNAPP EQUIPMENT

FOR CAN LINES–STANDARD-KNAPP PROVIDES

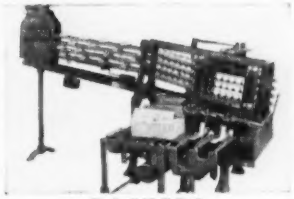


UNLOADERS

UNSCRAMBLERS



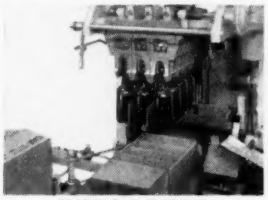
LABELERS



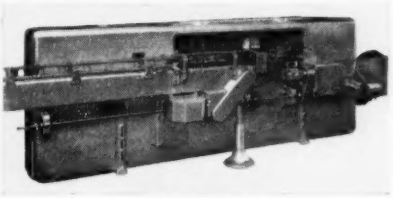
PACKERS

also: CONVERGERS, PALLETIZERS and DE-PALLETIZERS, BOOSTERS, CARTON MAKE-UP UNITS, CASE GLUERS and SEALERS

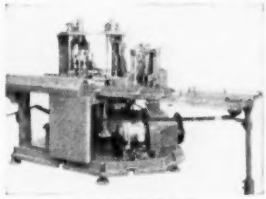
FOR GLASS LINES–STANDARD-KNAPP PROVIDES



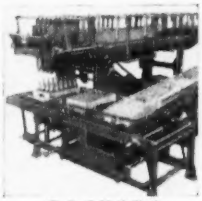
UNLOADERS



RINSERS



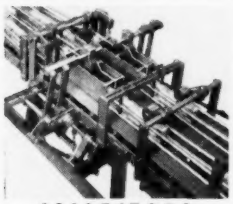
LABELERS



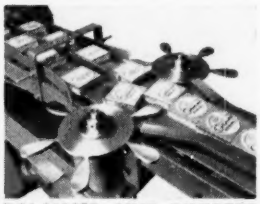
PACKERS

also: CONVERGERS, UNSCRAMBLERS, CASE GLUERS and SEALERS, CARTON MAKE-UP UNITS, WOODEN CASE CLEANERS

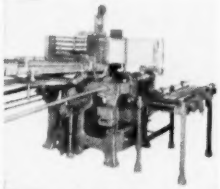
FOR CARTON & BAG LINES–STANDARD-KNAPP PROVIDES



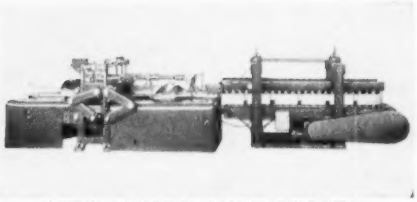
COLLECTORS



BALANCED LINE DIVIDERS



PACKERS



CASE GLUERS AND SEALERS

FOR ALL LINES–STANDARD-KNAPP PROVIDES

know-how on all phases of your packaging operations . . . expert guidance in planning machine layout . . . localized engineering, sales and service.

FOR THE COMPLETE S-K STORY

write for catalogs describing machines for your industry to Dept. F, Standard-Knapp, division of Emhart Mfg. Co., Portland, Conn.

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 For more information, use coupon on page 213.

Everybody's going to be happy the day you start sealing your vacuum packed products with Crown Vacuum Lug Caps.

YOUR CUSTOMERS will welcome their convenience. Mrs. Housewife loves the way Crown Vacuum Lug Caps can be removed with a simple quarter-turn by hand . . . the perfect re-seal these closures make, over and over again.

YOU WILL like the dependable hermetic seal these caps provide . . . the speed at which they are applied with Crown's automatic vacuum capper. Without a doubt, this is one of the most important developments in glass packaging that has come along for years. Ask us for complete information about sealing with Crown Vacuum Lug Caps . . . write or call today.

CROWN *Vacuum Lug Caps*

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IT'S AMERICA'S *Payload* FAVORITE

Armour Star Ham Delivered by WHITE 3000

DELICIOUS HAM . . . and many of the more than 2,000 Armour and Company products for home, farm and industry . . . travel from 34 Armour packing plants all over America, in a modern fleet of trucks . . . like this White 3000 engineered for extra payload.

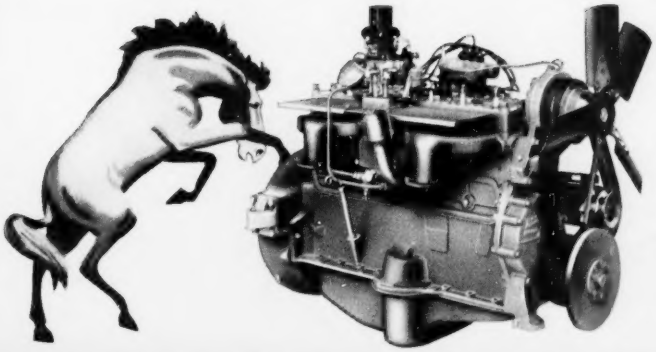
NO WONDER White Trucks are America's *payload* favorites! It stands to reason that a *quality* truck engineered to your exact operating needs will do *more* work . . . cost less to operate . . . carry more of *your* payload . . . than a truck bought "off the shelf."

Skilled White Representatives who *know* trucks will analyze your truck operations scientifically, help you get the most out of your present equipment, then project your needs in exact terms of your operating requirements. You know in advance what your White Trucks will do . . . how much they will save you . . . how much more they will earn for you.

See your White Representative without delay. America's payload favorite is *your* best way to carry more . . . earn more, today and for years to come.

THE WHITE MOTOR COMPANY • Cleveland 1, Ohio

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

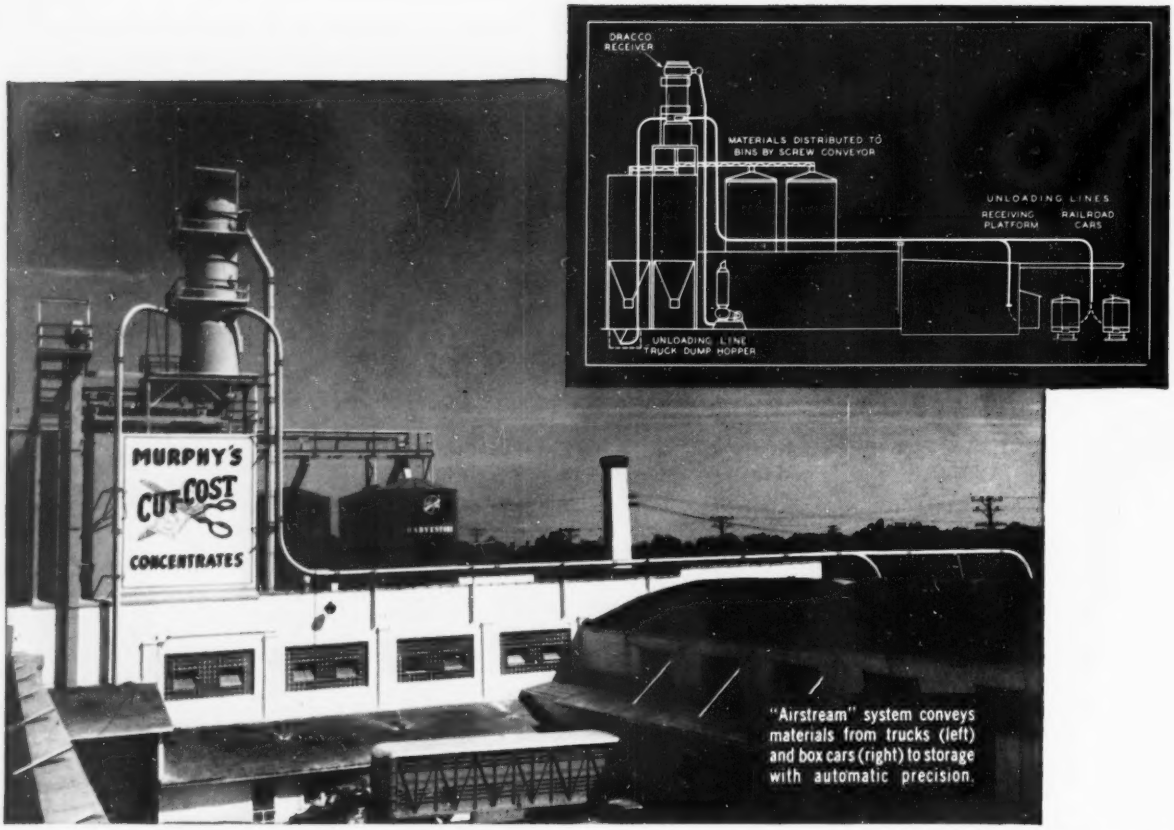


For Your Replacement Engine Needs . . .

WHITE MUSTANG POWER

HERE'S what is really *new* in truck power! White Mustang Power, with more power per pound, makes possible greater earning power . . . maximum payloads . . . plenty of power for tight schedules, hard runs.

Get Facts About WHITE MUSTANG POWER From Your White Representative



"Airstream" system conveys materials from trucks (left) and box cars (right) to storage with automatic precision.

Airstream CONVEYOR CUTS UNLOADING COSTS IN HALF!

Dracco Bulk Handling System at Feed Plant Produces Remarkable Savings

Handling costs for unloading feed ingredients at the Murphy Products Co., Burlington, Wisconsin, have been slashed to 50% of former levels. Installation of a Dracco "Airstream" Conveyor system has eliminated manual handling and made possible this outstanding economy.

Murphy Products Co., large producers of feed concentrates, unloads large quantities of ingredients including meat scraps, soybean oil meal, linseed meal, gluten meal, salt and other feed components. In place of expensive manual methods, an automatic, dust-free Dracco "Airstream" Conveyor (operated by two men) now does the job. The cost-cutting "Airstream" system propels feed components to storage at 30 tons per hour. Box cars are emptied in an hour and trucks in less time.

By using the "Airstream" technique, ingredients can now be received in bulk, eliminating the cost of bags. Outstanding savings are thus realized on buying and handling feed ingredients at Murphy.

The introduction of the mechanized "Airstream" method has resulted in remarkable savings in many plants. If you handle bulk materials, write today for information on how to move them by "Airstream".

DRACCO CORPORATION
4085 East 116th Street • Cleveland 5, Ohio

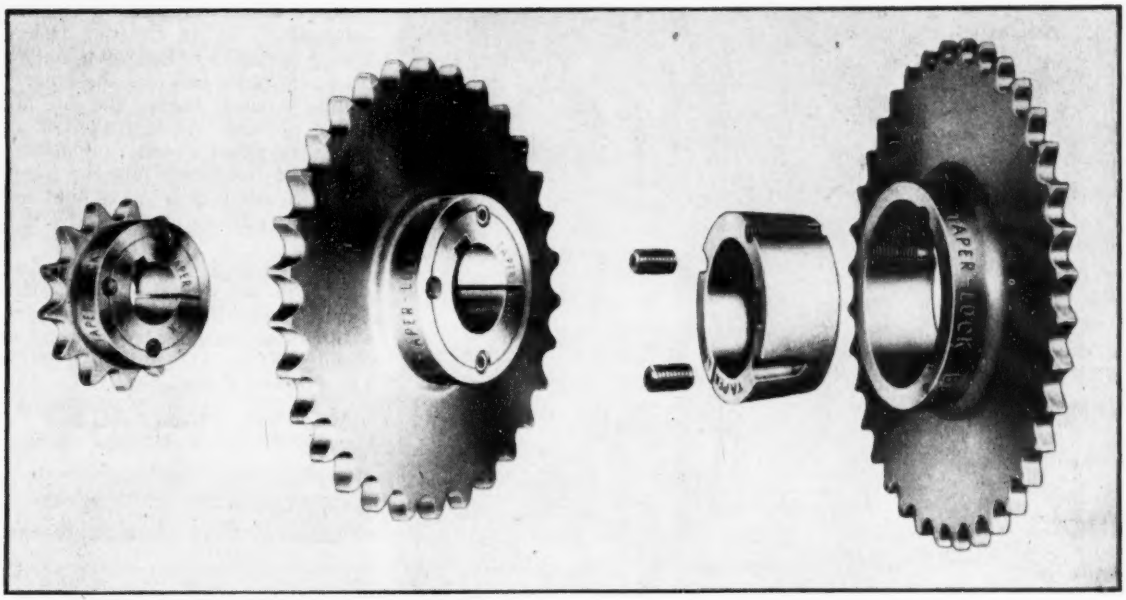
The economies and advantages of the Dracco "Airstream" method are presented in Bulletin 529. A copy will be sent you on request.

DRACCO

Performance Proved

Airstream CONVEYORS • DUST CONTROL EQUIPMENT

NEW EQUIPMENT & SUPPLIES



New Roller Chain Sprockets Replaced Quickly, Easily

One of chief advantages claimed for new line of sprockets and roller chain is "off-the-shelf" availability to roller chain drives. Application to sprockets of Taper-Lock principle does the trick.

Sprockets and bushings will be available in a range of sizes for majority of industrial applications. Use of new units eliminates costly and time-consuming reboring of sprockets to fit shafts. Further, shafts need not be turned and ground to get a tight fit. Taper-Lock not only is keyed to shaft, but grips it with firmness of a shrunk-on fit. Yet, when a sprocket is to be replaced it comes off easily, quickly, and the original bushing may be used repeatedly.

Here's how it works: On installation, two screws directly opposite each other are inserted and drawn up tight. To remove, screws are loosened and then one of screws is inserted in opening directly opposite split in bushing. Taking up on this screw readily releases bushing.

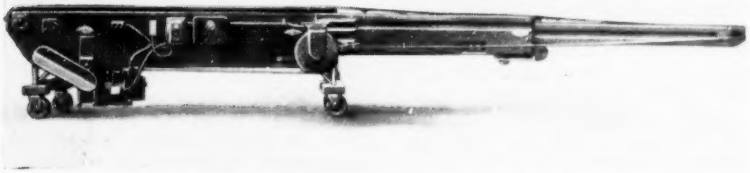
Sprockets are compact, have no flange and no protruding parts. They occupy no more space on shaft than standard sprockets. Flush design contributes materially to safety.

Both chain and sprockets are made to ASA standards. Sprockets will take any make of American Standard chain.

Distributors will carry a complete range of B-type steel sprockets, 40 to 100 pitch. Indicating extent of line, range in 50 pitch, for example, is 11 to 112 teeth. All bushings and smaller-size sprockets will be packaged individually. Chain will be packaged in 10-ft. lengths and can be furnished in 50 and 100-ft. reels.—*Dodge Manufacturing Corp., Mishawaka, Indiana.*

Circle 157A on Reader Service Card

Boom Doubles Portable Conveyor Length



This new double-boom Adjustoveyor is capable of increasing its open length 220 percent over its closed position.

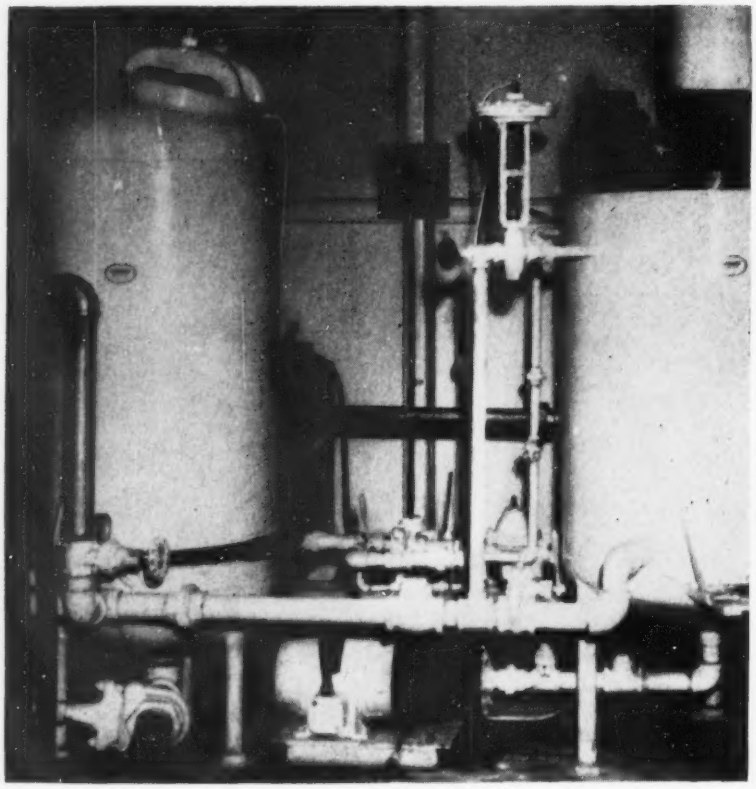
Unit can be used in many different positions and lengths, and is counterbalanced for ease of handling. It is mobile and can be moved readily.

Construction features heavy truss design, to carry loads of 50 to 100 lb. per linear ft., depending on model. Power-operated double-boom will carry full loads over its entire length. Models are available from 8 to 25 ft. closed, and from 16 to 61 ft. open.

Length of boom extension can be varied at will, with operating in-out buttons at each end of unit. It is available with fixed height legs, or adjustable legs that will allow elevations for stacking up to 30 deg. Belt speeds are variable, either forward or reverse.—*Stewart-Glapat Corp., Zanesville, Ohio.*

Circle 157B on Reader Service Card

Tank-Type Pressure Filter Has Fast Flow Rate



Controlled quality of filtration and high flow rates at low operating costs are claimed for this new tank-type pressure filter.

Unit was designed especially for food industry, to remove all solids from liquids, to obtain a sparkling clarity desirable in juices, jellies, syrups.

Construction of filter, maker states, accounts for its efficient performance. A series of synthetic, rigid porous stone membranes upon which filter-aid is deposited provide filtering surface with controlled clarity, fast flow and rapid backwash.

Use of diatomaceous silica, an inert material as filter media, provides clarity control and presents a clean filter area, with high flow rates for extended periods.

Cleaning and sterilization of filter can be accomplished without opening chamber due to construction. A patented tank closure permits unit to be opened for inspection or adjustment by release of just two bolts.

Units are available in many capacities in various metals and alloys as well as plastic or rubber lined to meet specific problems.—*Ogden Filter Co., 4214 Santa Monica Blvd., Los Angeles 29.*

Circle 158A on Reader Service Card

Paper Milk Containers Cased Automatically

Filled paper milk containers are automatically loaded into cases at speeds up to 160 containers or 8 packed cases per min. by a machine recently developed. Pack arrangement is 5 x 4 x 1.

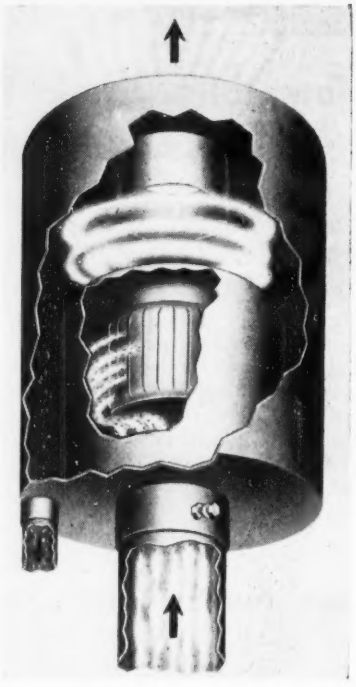
Built to comply with existing sanitation codes, all parts coming in contact with milk spilled within the unit are made of stainless steel. Cracks, crevices and protruding accessories were carefully designed out of the machine as sanitary measures. Another major feature is that the entire load forming and casing assemblies are easily removed for cleaning.

Machine, which operates hydraulically, functions as follows: Filled containers are conveyed to the intake conveyor of the caser. At this point, containers are gently placed on their sides while moving toward the packer proper. The load pattern desired for the case is formed by continuously feeding containers in a single lane into the load forming enclosure, located below the bottom of the funnel which holds the case. Cartons are then tiered automatically by an elevating table. During formation of load, an operator places an empty case over the funnel mouth, manually holding the case in proper position. As formation of a load is completed, a pusher automatically pushes containers into the case. The filled case is then moved onto an off-bearing conveyor and the cycle repeated.

While the machine described is designed for use with flat-topped containers, equipment is also being made available for the gable-type carton.—*Standard-Knapp, Div. of Emhart Mfg. Co., Portland, Conn.*

Circle 158B on Reader Service Card

Cleans Industrial Vapors Discharged to Atmosphere



New exhaust head has been developed for industrial stacks to clean up steam and vapors discharged to the atmosphere.

Unit is reported to effectively remove nuisance particles such as oil and process liquors vented which attack machinery, nearby buildings and/or create a public nuisance.

Head has no moving parts and, according to maker, is virtually maintenance free. Entrainment laden vapor entering purifier is engaged by a sta-

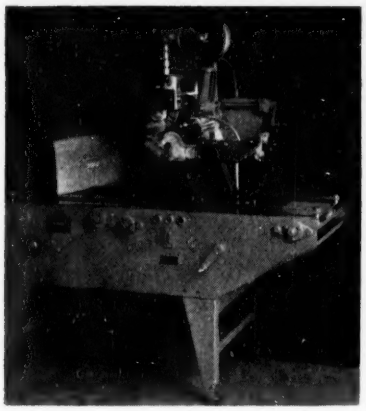
tionary centrifugal element which imparts a controlled rapid rotational motion to vapor.

This action guides all dirt particles, oil and water outward to walls of purifier. It is drained from along walls and ejected. Clean, dry steam continues upward and is discharged to atmosphere.

Although fabricated to specification, standard models have slip-on or flange connection for stack and a threaded connection for drain; fabricated steel body and stainless steel centrifugal element.—*V. D. Anderson Co.*, 1935 W. 96th St., *Cleveland* 2.

Circle 158C on Reader Service Card

Automatic Heat Sealer Spots Labels Accurately



This new automatic roll-type labeler is reported to accurately heat-seal a single die cut label (from a roll) in any position on top side of a cardboard box, or any package having a fairly uniform, supported surface.

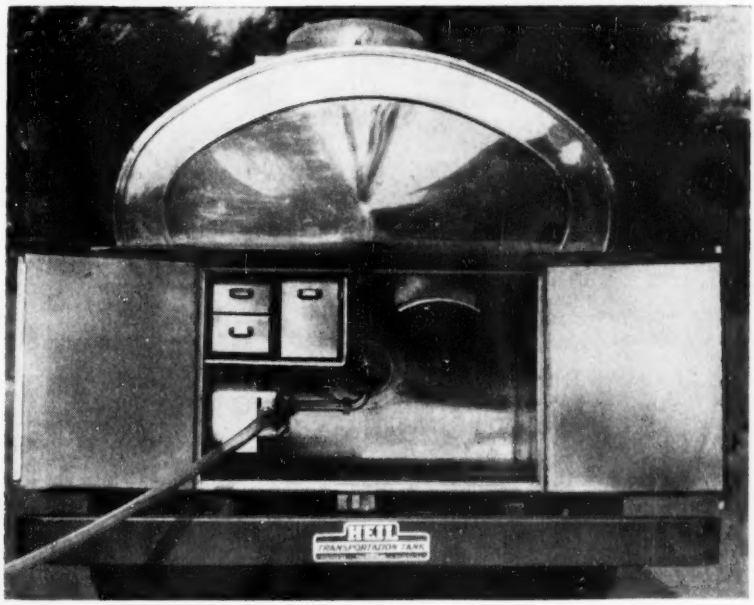
Label can be directly applied to cardboard container, or cellophane, glassine, wax or kraft paper overwrap. Called No. 804-B, its speed ranges from 40 to 80 packages per min.

Automatic package transfer is furnished as an integral unit and standard equipment. Packages are automatically spaced and synchronized with label mechanism. Positive heat and pressure on thermoplastic label assures full, strong seal.

Machine handles packages 6 to 18¾ in. long, 2½ to 10 in. wide, 1⅛ to 7¾ high. It applies labels 1⅛ to 3 in. cut-off, 1⅛ to 3½ in. long. Imprinter can be attached for adding variable copy on labels of uniform design. Imprint items can be changed quickly.—*Oliver Machinery Co., Grand Rapids, Mich.*

Circle 159A on Reader Service Card

Tank Trucks Equipped With Milk Receiving Unit



Benefits are reported provided to farmer, hauler, and dairy operator with use of these new farm pick-up tank trucks.

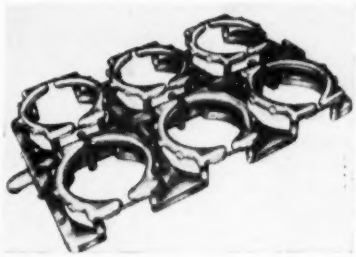
Hauling costs are reported reduced. Fast farm cooling to below 40 deg., less handling, and close control in transit, results in higher quality milk.

Large service cabinets on truck tanks are efficiently designed and usually located at rear. Cabinet doors are side-hinged with full-length, continuous stainless steel hinges. Cabinet is air-tight and locks securely with a refrigerator-type door latch. A separate motor compartment keeps heat and dirt out of service cabinet.

Combination rear inlet and outlet is equipped with nickel-silver, sanitary plunger-type valve through which tank is loaded and unloaded. Reversible pump is driven by motor and V-belt in motor compartment. Two sample trays, 50-lb. ice chest, and hose carrier are stainless steel. Transparent plastic tubing has a sanitary coupling at both ends.—*Heil Co.*, 3042 W. *Montana St.*, *Milwaukee* 1.

Circle 159B on Reader Service Card

Blow-Ring Carrier Ups Dust Collector Action



Faster installation and improved dust collector efficiency and operation are reported with use of newly designed blow ring carrier.

In new design, self-adjusting blow rings are mounted on cast aluminum carrier. Each blow ring is made in two half sections, each mounted on carrier by two flexible rubber tubes. Despite dimensional changes, due to filter bag shrinking or stretching, each blow ring is held snugly in contact with felt surface.

As rings travel length of bag in their automatic cleaning operation, they adjust themselves to variations in bag diameter, expanding and contracting where necessary. In addition, entire blow ring carrier assembly is so mounted that it floats laterally to accommodate vertical alignment of filter bags. This automatic self-adjusting and self-aligning feature is stated to eliminate unnecessary chafing or wear in concentrated areas along bag's surface.

Using cast aluminum in place of steel welded fabrication for new carrier, reduces weight by more than 50 percent and increases durability and strength of unit. Casting is made

GLOBE Seamless
GLOWELD Welded

- **Resistance to Corrosion**
- **Strength at High Temperatures**
- **Resistance to Oxidation at High Temperatures**
- **Ease of Fabrication**

TYPICAL ANALYSES AND TYPES:

302	309S	316Cb	330	410
302B	309Cb	317	347	430
304	310	321	403	443
308	314	329	405	446
309	316	INCONEL * — NICHROME **		

**Registered U.S. Trade-Mark* ***Trade-Mark Reg. U.S. Pat. Off. D-H Co.*

Globe produces more than 26 standard analyses of stainless steel tubes — also special analyses when required. Because varying analyses have widely varying service characteristics, Globe will make recommendations only after careful study of your particular problem.

GLOBE

specialization...

meets your exact requirements in

STAINLESS STEEL TUBES

Write for Bulletin 333 — Corrosion and Heat Resisting Steel Analyses Chart — a valuable reference tabulation of stainless steel analyses as produced by various manufacturers.

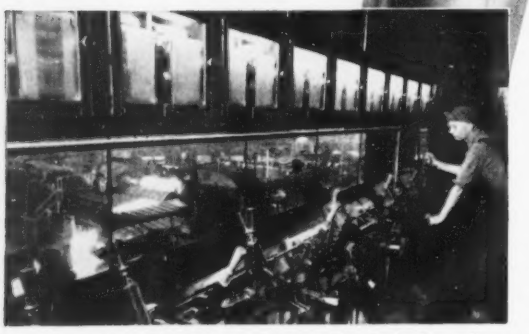
SIZE RANGE:

Globe seamless stainless steel tubing may be had in sizes from ½ inch to 6 inches O.D., and in pipe sizes ⅛ inch to 6 inches, standard, extra strong and double extra strong weights.

Gloweld electric welded stainless steel tubing is available in sizes ranging from ¼ inch to 5 inches O.D. inclusive; in standard weight pipe (schedule 40) sizes ⅛ inch to 2 inches — lightweight pipe (schedule 5 and 10) ⅛ inch to 4½ inches inclusive.

TOLERANCE RANGE:

All stainless tubing furnished to standard A.S.T.M. specifications unless otherwise specified to suit your particular application requirements.



Piercing, rolling and reduction of seamless tubes is closely monitored from this control room — typical of the highly specialized equipment in the Globe mill.

Globe specialization gives you uniform high quality...

Precision checks — and re-checks — at every stage of production insure Globe stainless steel tubes that meet *your* exacting specifications. For more than thirty years, specialization in production of steel tubes has key-noted all Globe research, engineering and mill operations. Write for the Globe Stainless Steel Tubes catalog.

GLOBE STEEL TUBES CO., Milwaukee 46, Wis.

Chicago — Cleveland — Detroit — New York — Philadelphia — St. Louis — Denver — Houston — San Francisco — Glendale, Cal.

Producers of Globe seamless stainless steel tubes — Gloweld welded stainless steel tubes — alloy — carbon seamless steel tubes — Globeiron (high purity ingot-iron) seamless tubes — Globe welding fittings.

of hollow sections bolted together. High pressure air, for reverse-air-jet cleaning action, is fed through hollow casting, up flexible tubes into each blow ring. Method is reported to assure an even and abundant supply of high pressure air at all times.

Because of reduction in weight whole carrier reacts quickly to vertical travel cleaning function and to bag contour and alignment action. Motor size and power requirements to drive carrier up and down are also reduced.—*Turner & Haws Engineering Co., Inc., 87 Gardiner St., Boston.*

Circle 159C on Reader Service Card

Provides Protection In Changing Fuses

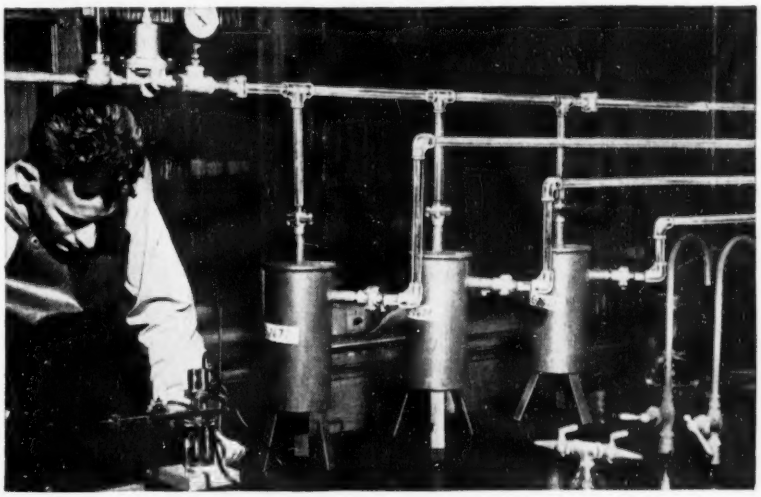
Safe and convenient handling is reported with use of new gang-operated disconnect methods for de-energizing fuses on high voltage motor control.

New fuse compartment, called Sa-Fuse, uses movable panel on which current-limiting fuses are gang-mounted. Fuse panel has disconnecting blades behind it. When compartment door is opened, fuse panel is automatically pulled to front, disconnecting panel from line, and putting fuses within easy reach. Operator can then safely and easily remove and replace fuses without a hook stick.

Mechanical and electrical interlocks prevent fuses being disconnected when switch is closed, and prevent closing motor switch with door open. Target indicators on door tell whether motor switch is opened or closed, and whether fuse panel is connected or disconnected. Door can be locked with fuse panel in either connected or disconnected position. — *Electric Machinery Mfg. Co., Minneapolis 13, Minn.*

Circle 161A on Reader Service Card

Plastic Pipe, Fittings Are Easily Joined



Many advantages in the handling of oils, gasses, water and slurries are claimed with use of transparent plastic pipe and fittings in laboratory and pilot plant.

Known as Mills III, new pipe is made of cellulose acetate butyrate and is stated to have a high resistance to corrosion and other forms of chemical attack.

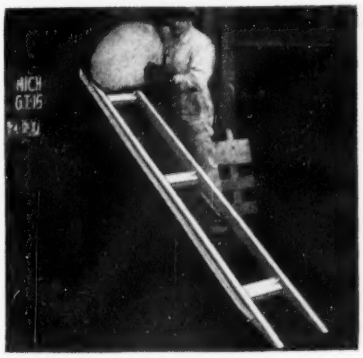
Sections of pipe are quickly and easily joined by a solvent cement producing leak-proof, homogeneous bond. No threading or special tools are required, even when connecting to standard steel pipe and fittings. Cuts easily with ordinary hand saw. Set-ups may be dismantled and all components reused. Alterations in any set-up can be made in minutes.

Complete assortment of plastic fittings is available for use with pipe, including flange unions and flange adapter unions for joining plastic to steel or plastic to plastic, as well as usual ells, tees and couplings.

Pipe is termed tough, shatterproof, and requires a minimum of support. Although semirigid, it is flexible enough to permit broad radius bends and considerable misalignment. Sizes up to 2 in. have a working pressure of 100 psi. at 100 deg. F. Available sizes range from ½ through 4 in.—*Elmer E. Mills Corp., 2930 N. Ashland Ave., Chicago 13.*

Circle 161B on Reader Service Card

Lightweight Skid Eases Handling of Drums



Fast, safe handling of drums and barrels is reported with use of new, all-magnesium skid.

Of welded construction throughout, skid is fabricated entirely of magnesium, and combines light weight and ease of handling, with strength. Use of unit reduces risk of lifting injuries, and assures greater safety to men and equipment.

Skids are available in standard sizes, ranging from 5 to 18 ft. in length, and special sizes.—*Magline Inc., Mercer St., Pinconning, Mich.*

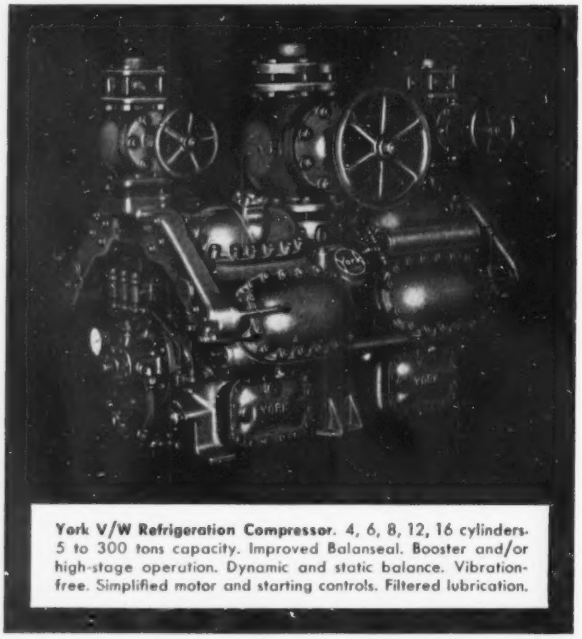
Circle 161C on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—page 213. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

break the V/olume Profit paradox WITH YORK'S FAMOUS V/W COMPRESSOR!



York V/W Refrigeration Compressor. 4, 6, 8, 12, 16 cylinders. 5 to 300 tons capacity. Improved Balanseal. Booster and/or high-stage operation. Dynamic and static balance. Vibration-free. Simplified motor and starting controls. Filtered lubrication.

1953 is a good year for you to plan capital investments. Your treasurer knows that from now on profits will depend less on increased volume . . . more on equipment that will work harder, better, longer at lower cost.

That's an accurate description of a York V/W Refrigeration Compressor. Tough and durable, the York V/W Compressor has a low initial cost . . . saves you up to 72% power costs at 25% load . . . and is low in upkeep because every wearable part is easily and quickly replaced.

It allows you to utilize your present space more profitably because it takes up less area . . . needs no special foundations for upper floor mounting. You can utilize manpower and work-hours more profitably because you can schedule your loads with complete flexibility. Nor is York limited to a fixed capacity.

Consult your nearest York Representative today. He's listed in your phone book. He'll help you estimate the number and sizes of York V/W Refrigeration Compressors you need. Or write, if you prefer, to York Corporation, York, Pennsylvania.

You'll Cut Costs With A York V/W Refrigeration Compressor

1. Low Initial Costs
2. Low Operating Costs
3. Space-Saving Compactness
4. Simplified Motors and Starting Controls
5. Low Maintenance Costs
6. Vibration-Free Operation
7. Filtered Lubrication
8. Positive Lubrication
9. Positive Shaft Seal
10. Booster and/or High-Stage Operation
11. Complete New Line

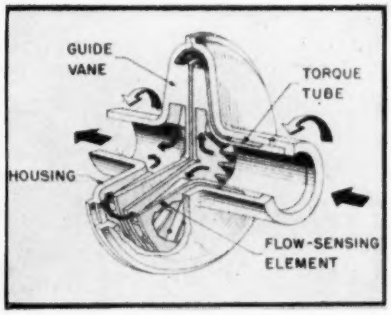
YORK REFRIGERATION AND AIR CONDITIONING

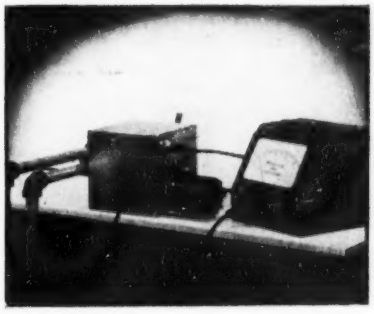
HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

York refrigeration air conditioning

For more information, use coupon on page 213.

New Flowmeter Registers Directly in Pounds





Sensitive only to pounds, this new instrument is reported capable of measuring mass rate of flow of anything that will flow or fall through a pipe. Mass meter is claimed unique in its response to weight and insensitivity to volume.

Direct reading measurements in terms of lb. per min. can be made on gases, liquids, slurries, or particles in an air stream, all with same instrument. Accuracy of measurement is independent of volume, temperature, pressure, viscosity, compressibility, or external accelerations.

For industrial use, two or more units could be used with proportioner to control mixture in process. Readily adaptable to loading, unit may be used to measure flow of grain going into hold of ship.

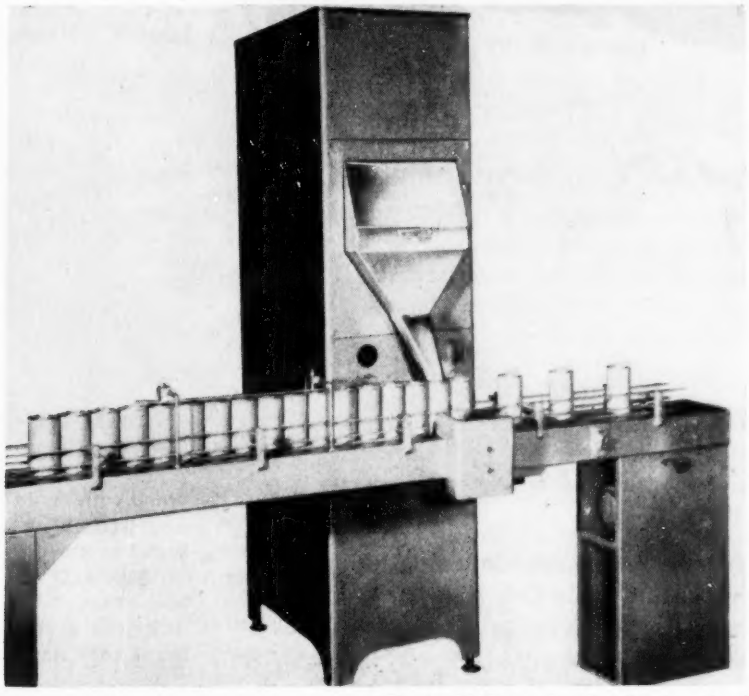
Principle of operation is as follows: Basically, mass rate of flow is measured by determining the moment necessary to give mass a Coriolis acceleration. Referring to cutaway drawing, it will be noted that fluid stream is forced out radially by its own velocity. Path of a given particle is a spiral because sensing element and flowmeter case are rotating. Thus, particle now has an increasing tangential velocity imparted to it by the flowmeter.

To obtain velocity change, the mass of particle had to be accelerated. In short, a force was acting on mass to produce a Coriolis acceleration. Reaction to the force was exerted on the vane of the sensing element which formed a torque about the axis of rotation and served to twist torque tube. Measurement to be made is the amount of twist in torque tube or phase shift between sensing element and rotating case.

Until such time as flow rates and sizes can be standardized, new meter will be custom built for the job. Though vital military and industrial needs will be met first, first models are already in operation and others are now in design stage.—*Control Engineering Corp., 560 Providence Highway, Norwood, Mass.*

Circle 163A on Reader Service Card

Filler Speedily Changed for Size Variations



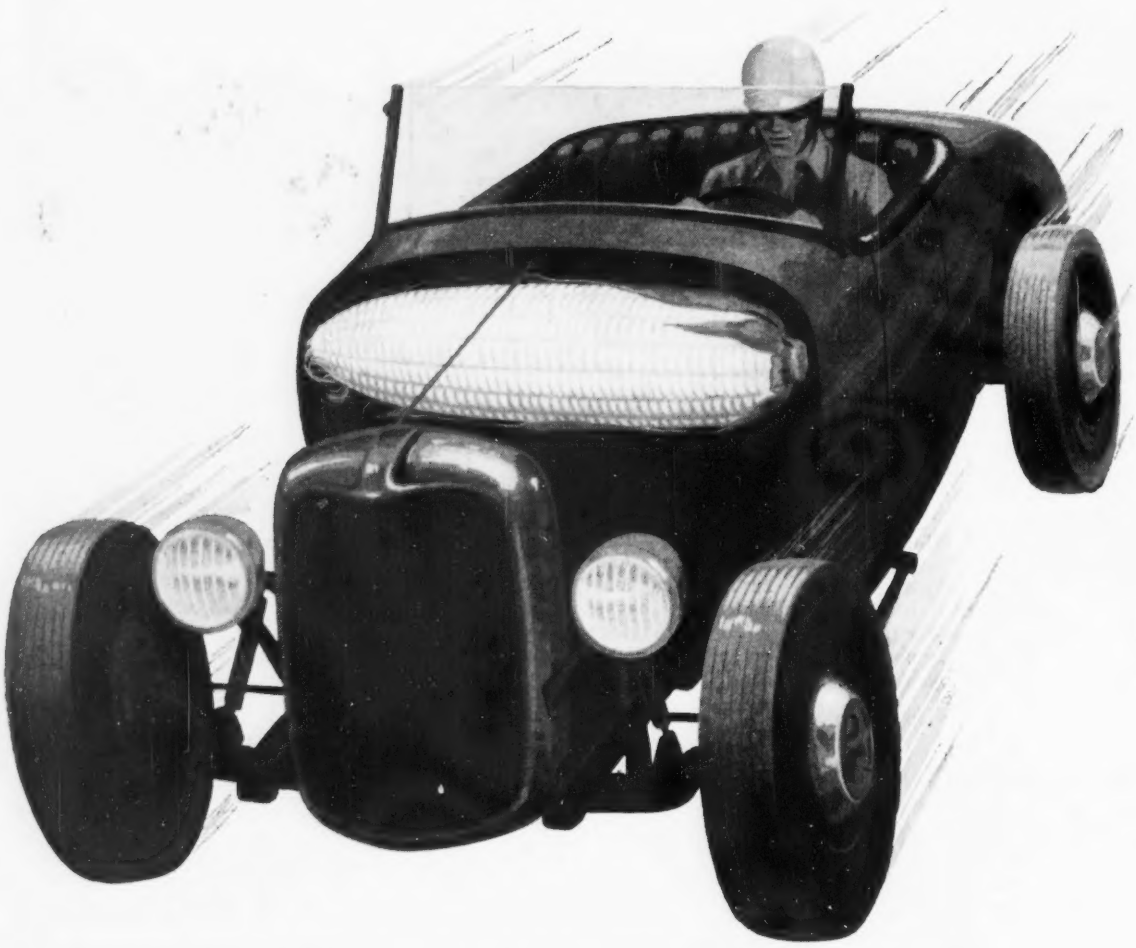
Quick changeover in product size and weight range is said to be provided by this fully enclosed net weighing and filling machine. New machine is semiautomatic for all types of container filling including bags, and fully automatic for flat bottom containers.

As a filling-conveying unit, it handles jars, cartons and cans of any size and shape with quick changeover of product and container. Containers are fed to incoming side of conveyor, stopped and held under filling spout by control fingers. When filled, they are released to outgoing side. If container is not in filing position, mechanism will automatically stop. Containers automatically self-align themselves and move to filling spout in timing with filing operation. Conveyor is electrically synchronized with weighing machine.

Net weigher specifications are: Height 85 in., width 22 in.; depth 36 in. Operates on 110/120v. a.c. Standard conveyor is supplied 8 ft. long and 33 in. high. Powered by a 110v., 60 cycle, gearhead motor.—*Frazier and Son, Belleville, N. J.*

Circle 163B on Reader Service Card

what's **corn** doing hitting "70" down the pike?



CORN PERFORMS VITAL FUNCTIONS... IN MANY UNEXPECTED PLACES

Under the hood of your car for instance...derivatives of corn were used in casting the cylinder heads... also in extracting (from its oxide, alumina) the aluminum used in the pistons and other essential parts. This is but one of the numerous examples of how continuous basic research in corn helps American industry... helps you.

CORN PRODUCTS IN FOOD

For food manufacturers and processors Corn Products Refining Company supplies highest quality dextrose, regular corn syrup, high conversion corn syrups and a variety of superior starches...recommended ingredients for many processing formulas.

We offer quality in volume supply unexcelled in the field. Complete technical service is available without cost or obligation. If you have a production problem why not check with Corn Products. We welcome your specific technical inquiries.

CERELOSE®
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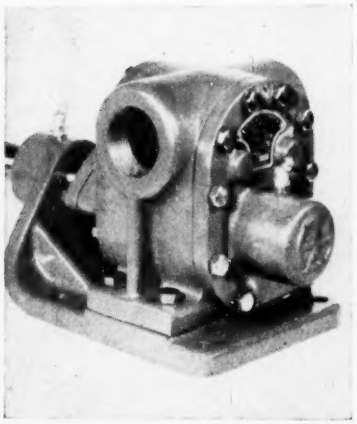
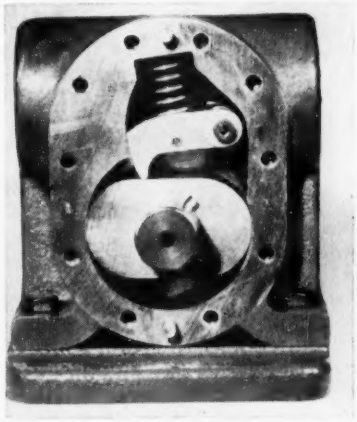
GLOBE®
brand corn syrup
BUFFALO®
brand corn starch
HUDSON RIVER®
brand corn starch

CORN PRODUCTS REFINING COMPANY, 17 Battery Place, New York 4, N. Y.

Pump Employs Corrosion Resistant Materials





Lower power and maintenance costs are reported for this new positive displacement pump constructed of corrosion resistant materials.

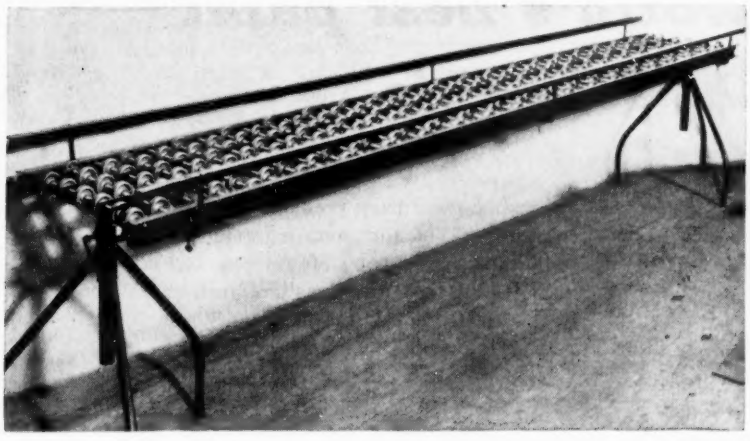
Two double-lobe rotors, set at 90 deg., on a single shaft give uniform pumping action. Use of mechanical seal does away with packing troubles and adjustments.

Body of pump is made of Ni-Resist cast nickel alloy. Stainless steel compression springs actuate arms. Ni-Resist arms form seal between intake and discharge. Rotors, precision machined, are also made of Ni-Resist. Shaft is made of hardened and ground stainless steel.

Specifications are: Displacement, 11 to 27 gpm., speed, 400 to 1,000 rpm.; discharge pressure, up to 100 psi.; vacuum, up to 28 in. mercury; weight (including underframe), 37½ lb.; suction and discharge pipe sizes, 1½ in., drive shaft diameter, 1⅛ in.—*Hinkley Corp., Pump Div., 264 Arlington St., Watertown, Mass.*

Circle 165A on Reader Service Card

Gravity Wheel Conveyors Are Easy to Maintain



Flat bottom cartons, boxes, cases and some cylindrical objects can be efficiently handled on a new line of all-welded gravity wheel conveyors.

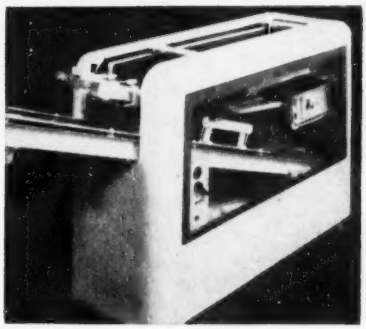
Straight line, 45 and 90 deg. curved, gated sections and switches, adjustable stands for gravity pitch, and portable trucks provide combinations to meet practically any layout.

New conveyors feature cadmium plated, long-life, grease packed wheels with seven ¼ in. dia. ball bearings that travel in case hardened raceways. Heavy duty frame is fabricated from steel channel and each 5 ft. straight line section has 3 crossmembers. The 10 ft. sections have 5 crossmembers for rigidity and alignment. Axles are located on 3 in. centers along channel frame, and are held in place by spring steel, snap rings to provide quick, easy maintenance.

Conveyors are available with 6 to 36 wheels per ft.—*Sage Equipment Co., 31 Essex St, Buffalo 13.*

Circle 165B on Reader Service Card

Half-Depth Unit Unloads 500 Bottles Per Min.



New machine, said to be applicable to all sizes and makes of magazine-type bottle washers, can unload 500 bottles per min.

Called "Half-Depth Uncaser," it is adjustable to any half-pint and pint half-depth case. Unit receives cases directly from plant conveyor, removes bottles from cases and deposits bottles on washer feeder table or conveyor system. Rubber V-belts are used to grip bottles below crown ring for gentle removal from containers.

Construction features include a case feed extension, an integral part of unit, Lucite "full view" removable side panels permitting observance of all operating parts and an automatic safety gate which eliminates "jam ups" caused by inverted bottles within cases.—*Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago 23.*

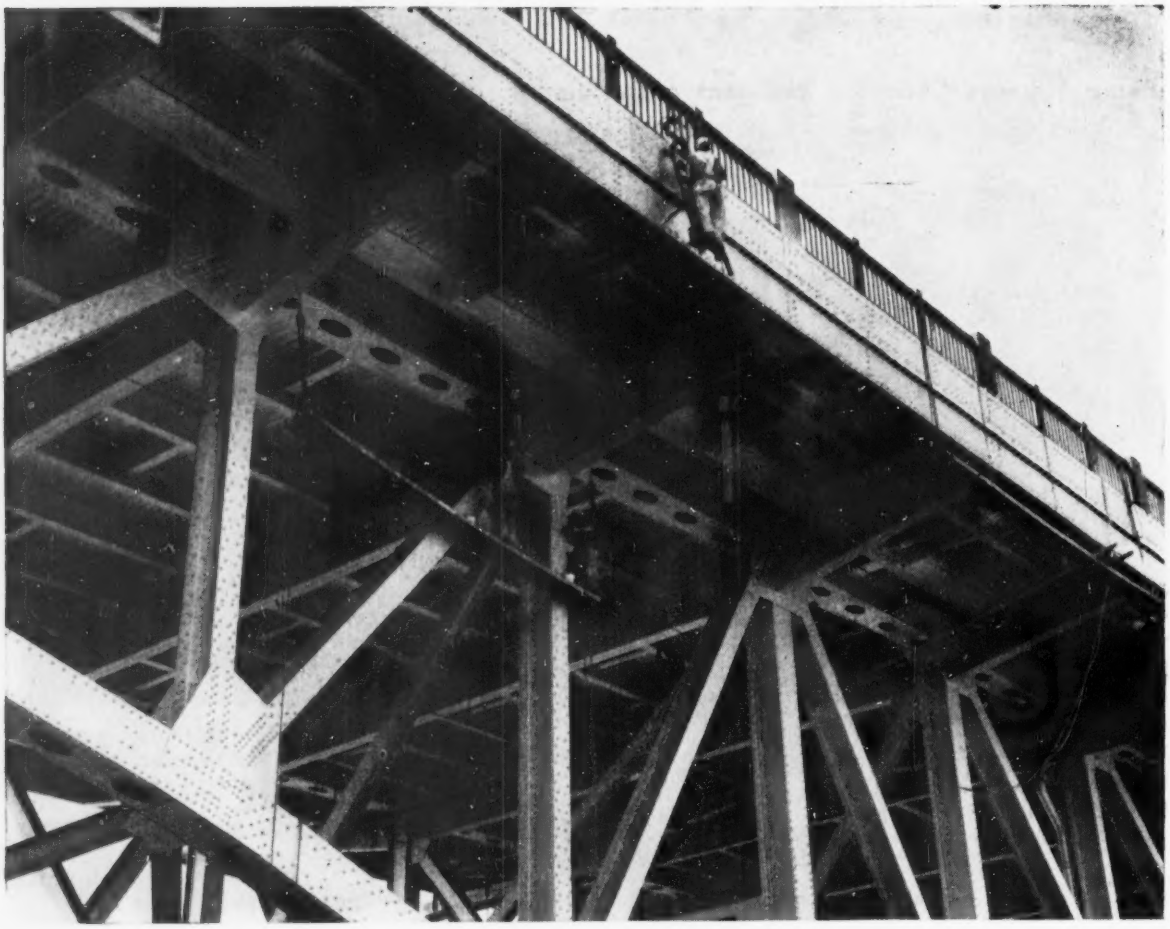
Circle 165C on Reader Service Card

Compact Bucket Elevator For Space-Tight Areas

Feeder storage hoppers in limited areas can now be loaded with recently designed, small, compact bucket elevator.

Named Model BES-77, elevator houses its malleable iron buckets in a 9 x 24 in. steel casing. Compact dimensions permit its use in chemical feeder rooms where minimum floor space is an important factor.

Boot, head and center section is fabricated of 12 gage mild steel and can be constructed to an overall height



You use the world's best paint on jobs like this

Of the $65,000 spent to paint this great bridge, less than a third was the cost of the paint itself. That's why it is economical to use the best quality aluminum paint that adds extra years between repaintings.

So much aluminum paint is used for metal and masonry surfaces that special formulas have been developed. Paints made to these formulas last longer, protect better under heat, cold, sun, rain, smoke and fumes.

If you have plants, structures or equipment that need paint, it will pay you to find out more about the kinds of aluminum paints now available. We do not make paint. But, as the leading suppliers of aluminum pigments to paint manufacturers, we want you to get the best results from the aluminum paint you buy.

Write us about your paint problems and we'll tell you what type of aluminum paint to use. We'll also send you a copy of *Painting with Aluminum*. It is packed with facts and answers to all types of industrial painting questions. Write Paint Service Bureau, Aluminum Company of America, 1788-D Alcoa Bldg., Pittsburgh 19, Pa.

Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA

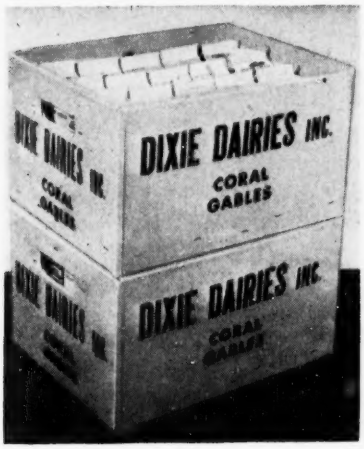
For more information, use coupon on page 213.

of 25 ft. if necessary. Each section has flanged ends and dust-tight joints.

Driven by a 1½ hp. gearhead motor, feed buckets travel on pintle chain from boot to head at maximum delivery of 200 cu. ft. per hr. Dust collectors, bin level switches and other accessories are available with equipment when required.—*Omega Machine Co., 345 Harris Ave., Providence, R. I.*

Circle 165D on Reader Service Card

Returnable Fiber Carrier For Paper Milk Bottles



Of interest to dairies and other food firms who make store-door deliveries is returnable carrier now being used to carry paper milk bottles. Built of a weather-resistant laminated fiber board having the ability to stand up under rain, snow or ice, it can also be washed and cleaned many times.

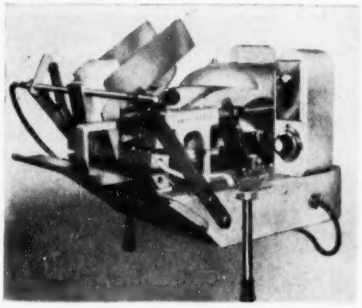
For economy in storage, milk bottle carrier is shipped to dairies knocked-down. Two pieces are combined in a single rigid unit by a simple stapling process. When assembled, carrier, for which a patent has been applied, has a protruding bottom section so that one unit can be partially nested in another to form a vertical tier. This prevents toppling or shifting during delivery. Hand holes are provided as well as holes in the bottom to permit water to run off.

Carriers are made to fit requirements of individual dairies and sides specially printed. Capacity varies with size of paper milk bottles used. One popular size accommodates 20 one-quart bottles although half-pint, half-gallon and gallon sizes can be accommodated.

Acceptance of new container by dairies has developed interest on part of others having problem of transporting similarly shaped fragile articles, like bread and berry boxes, where load must be supported entirely by walls of container. — *Gaylord Container Corp., 117 N. Fourth St., St. Louis 2, Mo.*

Circle 167A on Reader Service Card

Fast, Automatic Unit Seals, Labels Bags



Accurate, high-speed handling of bags is claimed for this new vacumatic heat sealer and labeler.

Machine feeds, folds and seals label and bag in one automatic operation, folding label exactly in half or short on one side and long on other, as required. It is adaptable to label widths ranging from 2 to 7 in.

Unit, maker states, will automatically discharge labels uniformly and uninterruptedly down to last one in magazine. A vacuum control valve regulates speed of label release when varying bag weights and materials.

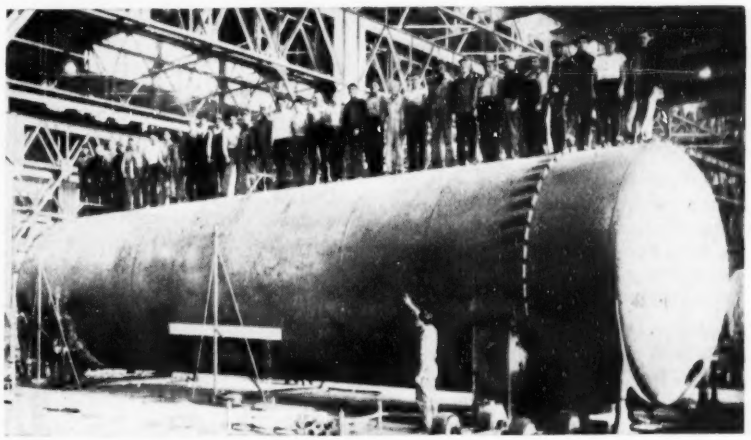
Machine can also be operated as a straight sealer. It will heat seal cellophane, polyethylene, pliofilm and other sealing films and foils.—*Mercury Heat Sealing Equipment Co., 331 N. Eleventh St., Philadelphia 7.*

Circle 167B on Reader Service Card

Right Angle Gear Drive Is Dust, Weather Proof

To meet difficult conditions of exposed operations, right angle gear drive is reported completely dustproof and weatherproof.

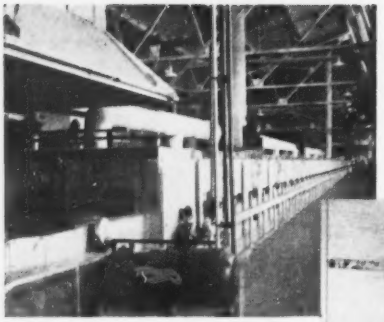
Drive offers a wide application as a connecting right angle unit of power transmission for various prime movers such as gas engines, steam turbines and electric motors. It is adaptable



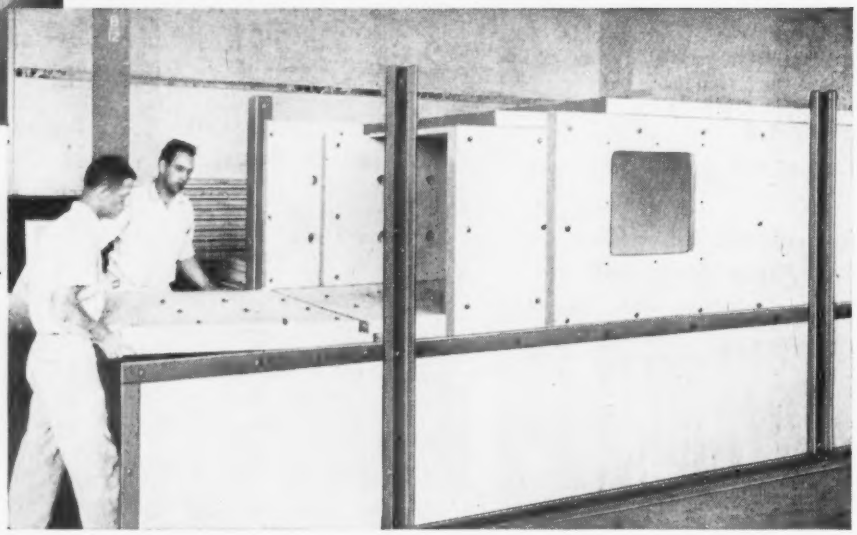
Holds a Million Glasses of Beer in Minimum Space

FIRST of a new line of giant, one-piece glass-lined storage tanks is illustrated above. This "pilot" model for others which will be built on special order, is 54 ft. long, 12 ft. dia., and is capable of holding one million glasses of beer. Huge tank offer brewers greater utilization of building space.—The Pfaudler Co., Rochester, N. Y.

Circle 167D on Reader Service Card



Typical band oven built with Marinite insulation. Insulation engineering by Johns-Manville.



Mechanics assembling a Marinite bakery oven. Marinite is used both as the structural and insulating material.

Modern bakery band ovens are *Built* and *Insulated* with one material . . . J-M MARINITE

When leaders in the baking industry look for ways to improve band-oven performance, they realize that efficient insulation is a primary requirement. Johns-Manville provides the answer to this need with J-M Marinite*, the *structural* insulating material. Marinite improves band-oven performance in three important ways:

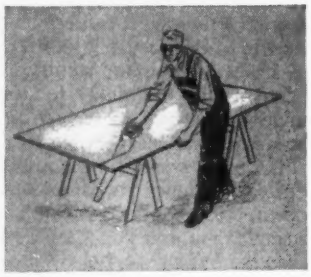
1. Cuts fuel bills—because it is an efficient thermal insulation . . . heat loss through Marinite oven walls is very slight. Fuel savings are substantial, for ovens of this type operate 24 hours a day, at temperatures up to 700F.

2. Improves temperature control—because it eliminates almost all through-metal fasteners and reduces the need for structural supports. Marinite construction provides uniform temperatures throughout the oven without local hot spots.

3. Reduces maintenance—because it is entirely unaffected by the high humidity and corrosive organic gases commonly prevalent in band ovens. Installation costs are also lower than with former methods of construction.

The Marinite oven installation illustrated here is but one example of how Johns-Manville insulating materials and Johns-Manville insulation engineering services are teamed with industry to develop improved processes and more efficient equipment. If you would like more information about Marinite Insulation and its application to your product or plant equipment, write Johns-Manville, Box 60, New York 16, New York. In Canada, 199 Bay Street, Toronto 1, Ontario.

*Reg. U. S. Pat. Off.



Marinite is an asbestos insulating material that combines great structural strength and excellent thermal characteristics. It is durable . . . proved in years of field experience. It is workable . . . can be fabricated with woodworking tools . . . can be cut, punched, shaped to fit. Also available fabricated to your specifications, ready to assemble.

Johns-Manville FIRST IN INSULATION

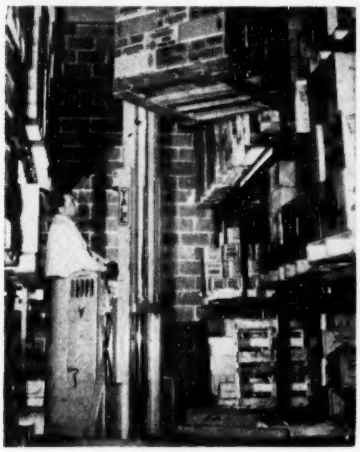
MATERIALS • ENGINEERING • APPLICATION

in either a vertical or horizontal position.

Installations are varied for gasoline, steam or electric motor power ranging from 15 to 450 hp. Maintenance is termed minimum.—*Johnson Gear & Mfg. Co., 8th & Parker Sts., Berkeley 10, Calif.*

Circle 167C on Reader Service Card

Rider-Type Fork Truck Is Light, Compact



New rider-type, electrically powered fork lift straddle truck is called the "Warehouser". Short in length and light in weight, unit is designed for right angle tiering in 5 to 6 ft. wide asiles, and for operating in elevators and on floors that will not sustain heavier loads.

Truck features three speeds forward as well as reverse, with time-delay controls between speeds for smooth acceleration. Available in 2,000 and 3,000 lb. models, it can lift loads as high as 133 in.

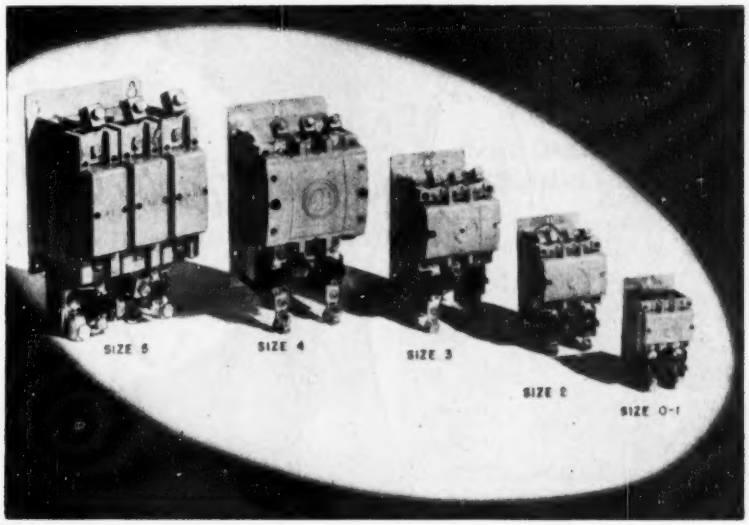
Drive unit consists of horizontally mounted motor with direct gear drive to splined axle. All gears are mounted on ball bearings. Unit is mounted on tapered roller bearings and has large diameter ball bearing steering ring with built-in self-aligning feature to assure easy steering. Unit provides a 200 deg. steering arc.

Power is turned off and brakes applied when operator leaves truck. Single hydraulic cylinder provides good visibility, enabling operator to see end of outriggers for accurate, close maneuvering.

Enclosed battery compartment with rollers permits easy battery removal from top or side.—*Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia, 15.*

Circle 169A on Reader Service Card

These Motor Starters Are Simple to Install



Fast and easy installation is reported for new, lightweight magnetic motor starters.

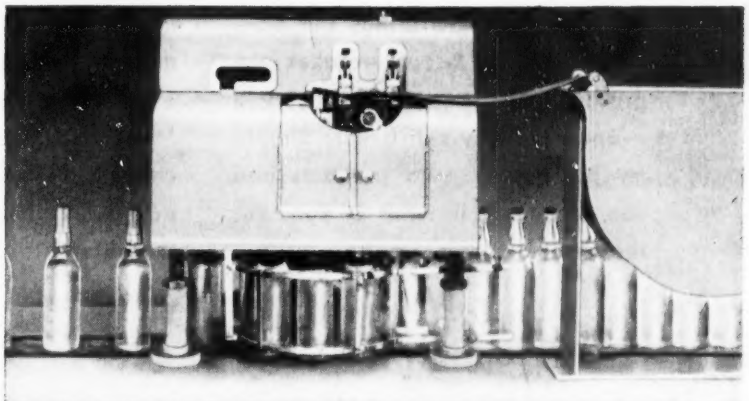
Called the "RA-V" (right angle) starter, it features vertical overloads below the contractor. Unit is specially designed to be used with Crouse-Hinds M52, Type EPC explosion proof condulet.

Small size and light weight offer following advantages: They require smaller condulets, reducing initial costs; light weight speeds installation. It is stated that two men can hang the largest sizes.

Lighter and smaller supporting racks can be employed. Size 2 starter can be installed in 7 in. condulet, 3 in 9 in., 4 in 11 in., and 5 is claimed to be only one that can be housed in an EPC condulet.—*Industrial Control Div., Arrow-Hart & Hegeman Electric Co., 103 Hawthorne St., Hartford 6, Conn.*

Circle 169B on Reader Service Card

New Unit Makes Banding Operation Automatic



Hand labor is replaced, a serious production handicap overcome and uniformly and precisely banded bottles are delivered by this new machine.

Some standards essential to automatic, precision labelling are applied to automatic banding with this unit. First machines off assembly line apply plain bands and printed bands that do not require accurate register in relation to printing. Any size or shape of bottle up to 3¾ in. dia. can be handled.

Machine works as follows: Cellulose banding material, in roll form, feeds into position over the bottle before being cut. Bottle is indexed to receive band by starwheel feed. Band is opened by combination of mechanical

Huron MSG added to canned soups and stews makes them taste better—sell better. MSG brings out *more* of the *natural* flavors—makes the product taste better when served—and naturally sell better. Simply try it on your own products and see for yourself what it does for them!

Only a very little Huron MSG is required to strengthen the natural flavors—bring out all the hidden delicate flavors; as little as 2 to 3 oz. per 100 lbs. of finished product in most soups and stews does it. No change in formula required—just add a little Huron MSG—and taste the difference!

For FREE working sample of Huron MSG or technical advice, call or write Technical Service Dept.—

THE HURON MILLING COMPANY · 9 PARK PLACE, N. Y. C. 7

Factories: Harbor Beach, Michigan

Sales Offices: 161 E. Grand Ave., Chicago 1 · 383 Brannon St., San Francisco 7 · 13 E. Eighth St., Cincinnati 2

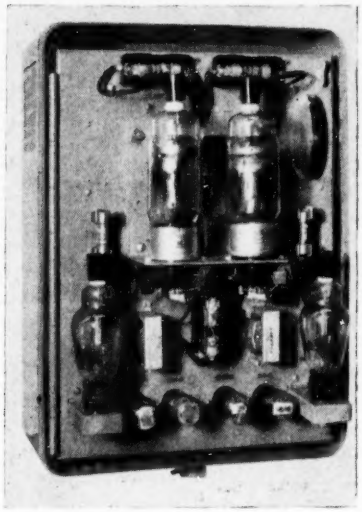
For more information, use coupon on page 213.

and vacuum action prior to accurate positioning of the cut band.

Simple attachments permit quick changeover to various sizes of bands and bottles. Operating attention is required only to renew roll of banding material. Operation of other machines on bottling line by same operator is perfectly feasible. Ease of maintenance and operation are features claimed for new machine.—*Economic Machinery Co., Div. of Geo. J. Meyer Mfg. Co., Worcester, Mass.*

Circle 169C on Reader Service Card

Packaged Electronic Unit Controls Machine Speeds



On many types of equipment in food plants, such as packaging machines, conveyors, speeds can be regulated with use of a simplified Thy-mo-trol packaged electronic adjustable-speed drive.

New unit available for ¾ to 3 hp. drives offers stepless speed-control, pre-set speed control, and close speed regulation, according to maker's engineers, and includes the smallest drive panel (illustrated above).

Drive is offered in standard speed ranges of 5:1 and 20:1, and comes in both reversing and non-reversing forms. It retains many features of larger drives including dynamic braking and standard overload and undervoltage protection.

Selection of a wide range of speeds is accomplished by turning a single knob. Motor will accelerate to and hold any pre-set speed within plus or minus three percent regardless of ordinary load changes.

Simplified system consists of an anode transformer, electronic control panel, control station, and d.c. shunt-wound motor.

It operates on 220/440v., single phase 50/60 cycles. Dual rating of anode transformer makes it possible to use either voltage by merely changing primary connections. Special drives can be supplied to operate from other standard power supplies. — *General Electric Co., Schenectady 5.*

Circle 171A on Reader Service Card

New Chemicals

Plastic Coating Reduces Insulation Maintenance

Protection, color identification and reduced maintenance on insulated refrigerant, cold water, steam lines and insulated equipment is said to be provided by a new easy-to-apply plastic coating. Dust, dirt, grease, oil can be washed off its smooth surface.

New finish, called Insulcolor is termed a tough plastic resistant to abrasion and can be applied either by brush or spray.

Material will withstand temperatures to 160 deg. F. without cracking, shrinking, or crazing. It may be used over heat insulation, cork pipe covering and lagging, and also as a finish over cork-insulated air-conditioning ducts.

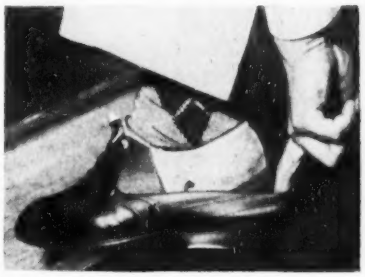
Coating is available in white and six colors—light and dark green, light and dark blue, yellow, and buff. It can be applied over standard asphaltic finishes without danger of bleeding through.

Water-resistant properties make it suitable for either inside or outside applications. No inflammable solvents are used. When dry, it is classified as fire-retardant and is odorless.

Base white material and color tint desired are shipped in separate containers and mixed on job. Base is supplied in 3½ gal. pails containing 3 gal. of material, allowing space for mixing. Coverage is 35 to 50 sq. ft. per gal. in two-coat application, depending on surface being finished.—*Armstrong Cork Co., Lancaster, Pa.*

Circle 171B on Reader Service Card

Neoprene Overshoes Resist Chemicals



Lightweight, toughness, resistant to oils and chemicals are features heralded for new neoprene rubbers designed for men who wear overshoes on the job. They are of particular value to men who work around oils, solvents, acids and other chemicals which damage ordinary rubbers.

Overshoes have no fabric lining. Field tests, according to manufacturer, have shown that omission of fabric exacts no sacrifice in durability.

To wearer, most noticeable advantages reported are lightness and comfort. They weigh 9 oz. apiece. Elasticity of neoprene upper assures a firm grip on shoe, so it won't pull off at heel. If dirt gets on inside, rubber can be readily turned inside out and inner surface cleaned.

Only three sizes need be stocked to take care of virtually all shoe sizes. "Small" overshoe fits shoe sizes 6 to 8, "medium" fits 9 to 9½, and "large" fits 9½ to 12.—*Tingley Rubber Corp., 903 Ross St., Rahway, N. J.*

Circle 171C on Reader Service Card

OTHER DEPARTMENTS

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In Behalf of Progress . . .

Don't Be the Cause of Injuries to Workers

More than 70 percent of today's occupational injuries occur in establishments without organized safety programs!

Quite a shocking statistic for two reasons: First, it is inexcusable for any industrial operation to be so careless of human safety as to take no well-planned steps to assure it. Second, accident prevention is cost prevention—through higher plant productivity, less employee turnover, and lower compensation insurance.

If management doesn't care about needless costs, that's its funeral. But when it permits workers to be injured through its negligence, that's someone else's funeral. To put it bluntly—it is blood on the boss' hands.

If one of your employees is hurt because you failed to take an accident-prevention step, your conscience should bother you just as if you had carelessly dropped a brick on his head.

Turn the situation around. Suppose you were injured in a train wreck. Likely you would sue for damages. And why not? The railroad makes a profit on your ride and you naturally expect to be transported safely for your money.

So what about the employee who is injured in your factory? You are making a profit by having him work for you. Then he has a right to expect safe employment. Most workers are paid to perform a non-hazardous routine operation, not to risk bodily injury. Which means that it is your responsibility to eliminate the risks.

Accidents often are attributed to worker carelessness. But what is carelessness? If a woman accidentally puts a finger under a revolving knife, that can be called carelessness, because she knows the knife will amputate a finger. Yet one can be pretty certain that the lady really cares a lot about that finger.

Absentmindedness would be a better way to explain it. And here we must face the facts of life. Everyone's attention drifts on occasion, if only for a second. And it is to expect the impossible to ask every worker to be 100 percent alert every second of his working life. Management must figure on his "off moments," when his faculties are fuzzy, for any one of many reasons ranging from semi-illness to a passing sweater girl.

Therefore a factory should be a safe place for fuzzy minded employees. The premises, machines, and tools ought to be accident-proof for a person in a mild momentary daze or day-dream.

Inexpensive, easily installed guards, safety signals, and stops will dehazardize most machines and operations. And where dangerous equipment must be fed by hand—like, say, a head splitter in a meat plant—a separate operating control for each hand will keep all ten fingers intact.

No new machine should be ordered without careful specification of safety features, where even slightly needed. And old machines should be as carefully equipped with such features.

Sure footing should be provided on floors and stairs. Elevated platforms and runways need guard rails. Low beams and pipes must be arrestingly marked. A safe level of lighting is essential. Cold rooms must open from inside. Other special hazards, like carbon dioxide in empty fermenting tanks, call for special precautions.

That is just to mention a few. But the idea is—don't take chances on anything. Life is no lottery!

It goes without saying that employees must be taught the safe way to work. And that supervisors aggressively enforce safety instructions as a routine matter.

It also is hardly necessary to mention that safety devices, such as goggles and metal-mesh finger guards, be provided where needed. Here again, however, it's not enough to provide them. You have to see that workers use them.

Keep a worker safe—even if you have to fire him to do it!

One can easily absolve himself from blame for injury to a worker who fails to follow safety instructions. But to do so is to shirk one's responsibility. When you ride in an airliner, someone makes certain that your safety belt is fastened before take-off and landing. They don't leave it up to you to protect yourself.

Now in addition to making a plant safe, you have to continually keep it that way. This requires regular periodic inspections.

And certainly when an accident occurs, a thorough, impartial investigation of the cause is called for, together with remedial action. And don't take "employee carelessness" as the reason too readily.

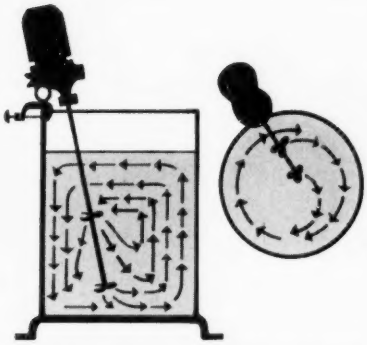
What this all adds up to is this: Every food company—no matter how small—must have a thorough, positive safety progam if its management, from president to straw boss, is to keep its conscience clear.

It's nice to keep blood off your hands. It's also a happy experience to cut costs. It's doubly gratifying to achieve both simultaneously through safety.

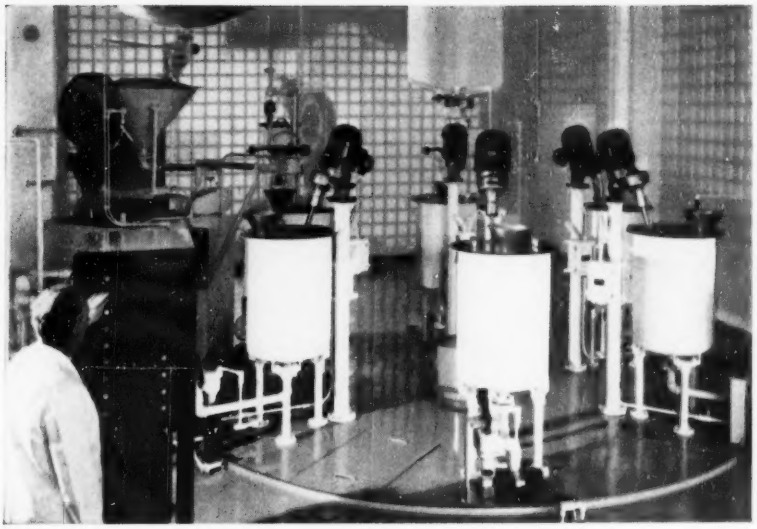
It takes a safety engineer if your plant is very big. It takes an executive assigned to accident prevention in a little place.

Whatever it takes, remember: Accidents don't happen. They are caused.

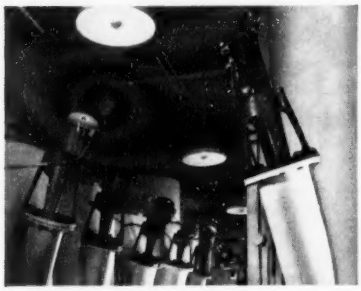
Don't let your negligence be the cause.



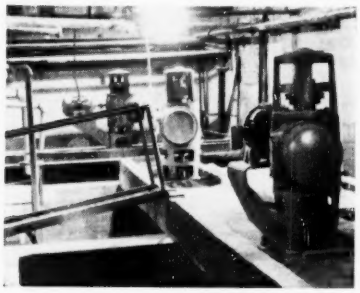
DOUBLE MIXING ACTION is illustrated above. LIGHTNIN Portable Mixers are easily set at the right angle to mix at high speed, without vortex. Mixer can be rotated from one tank to another; swung out of tank for easy cleaning.



LIGHTNIN Portable Mixers operating in strictly controlled sanitary conditions.



LIGHTNIN top entering propeller mixers, for open or closed tanks. Sizes ¼ to 3 HP.



LIGHTNIN turbine and paddle mixers, for big mixing jobs, fit any open tank or closed pressure vessel. Full range of speeds, impellers, materials of construction. Sizes 1 to 500 HP.

Get these helpful LIGHTNIN Catalogs

This library of mixing information is yours for the asking. Catalogs contain helpful data on impeller selection; sizing; best type of vessel; valuable installation and operating hints; complete description of LIGHTNIN Mixers.

MIXCO fluid mixing specialists

Try This Simple Way to Speed Up Fluid Mixing—

Mixing fluids with a LIGHTNIN Mixer is simple, and fast. It's simple, because there are no complex gadgets to take apart, clean, and reassemble.

The mixer shaft fits into a hollow tube, tapered for perfect alignment. One turn of a wrench disassembles the mixer for cleaning, or puts it back together again.

It's fast, because the mixer adjusts freely to the right mixing angle for your conditions. The high-speed propeller stream sweeps the tank bottom and gives you rapid top-to-bottom turnover plus round-and-round rotation of the materials you want to mix.

This means intimate blending of liquids, quick dissolving of the finest powders, highly stable emulsions—uniform mixes that stay mixed.

Fully Guaranteed—There's a LIGHTNIN Mixer for your product, in a metal to fit the need. Thirty models to choose from. And every one is guaranteed to do the job and do it *right*—or your money back.

For quick help on fluid mixing, let us know the materials you are mixing and the results you want. Free facts—no obligation. Write us today, won't you?

Lightnin® Mixers

MIXING EQUIPMENT Co., Inc.
143 Mt. Read Blvd., Rochester 11, N. Y.
In Canada: William & J. G. Greey, Ltd., Toronto 1, Ont.

- ☐ DH-50 Laboratory Mixers
- ☐ B-75 Portable Mixers (electric and air driven)
- ☐ B-102 Top Entering Mixers (turbine and paddle types)
- ☐ B-103 Top Entering Mixers (propeller type)
- ☐ B-104 Side Entering Mixers
- ☐ B-105 Condensed Catalog (complete line)
- ☐ B-107 Mixing Data Sheet

Please send me the catalogs checked at left.

Name_____

Title_____

Company_____

Address_____

City_____ State_____

1 **GRADER** utilizes slotted moving frames to separate cukes into six sizes.

2 **WASHER** removes field dirt by pressure water sprays, immersion, and rotation.

Making Fresh-Pack Pickles

Line Speeds New Product . . . Control Continuous, Pasteurization Precise

THIS unimpeded line-flow layout, set up for dynamic "in stream" quality control, turns out fresh pasteurized cucumber pickles in high volume at the new Chaska, Minn. plant of M. A. Gedney Co.

Detailed here in our foldout flowsheet is the system used for processing fresh cucumber slices—the bread and butter type pickles. However, by detouring slicing units the same layout also handles whole fresh cucumber dills.

Cucumbers for fresh pack are harvested on the morning of processing and rushed to the plant in 100 lb. sacks.

QUALITY TROUBLE? AT A MINIMUM! Because the program's keyed to stop it before it happens. That's the story behind this top-flight line—all recounted in this month's feature, "Process-Paced Quality Control," on page 80.

Growers are paid on delivery, price being based on weight and grading quality.

Sacks are emptied onto a slatted conveyor supplying a continuous grading machine where cukes are separated into six sizes—Point (1) in diagram. The grader works on the shaker principle with fall-through slots for different lengths and thicknesses.

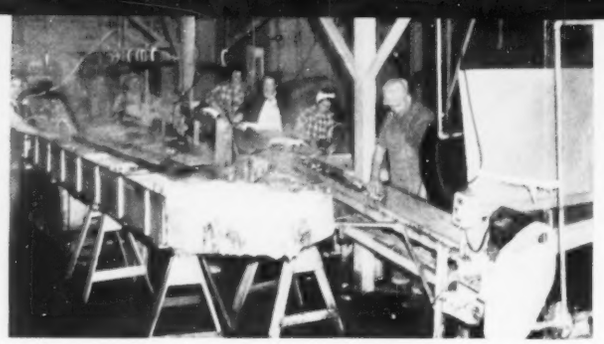
The cukes are graded into lug boxes, which are then stacked preparatory to running uniform size batches. Going into process, lugs are emptied onto an elevating conveyor which feeds a two-section rotary washer—Point (2). Here, an initial low-pressure water spray removes superficial field dirt, and a final 300 lb. high pressure jet spray rids the product of clinging residue. Thorough immersion and reel rotation during washing aids in effective cleaning.

Washed cucumbers are belt-routed through three parallel slicing machines where pickle disks about ¼-in thick are formed. In these units, cutting is performed as the rotating cucumbers, which have been oriented by attendants, move against stationary knives.

Slices are then conveyed into a U-type immersion blancher, which is filled with circulating hot salt brine. A powered series of paddles push the slices through the unit in 7 min. Purpose of the blanch is to make the cucumbers pliable and thus easy to pack.

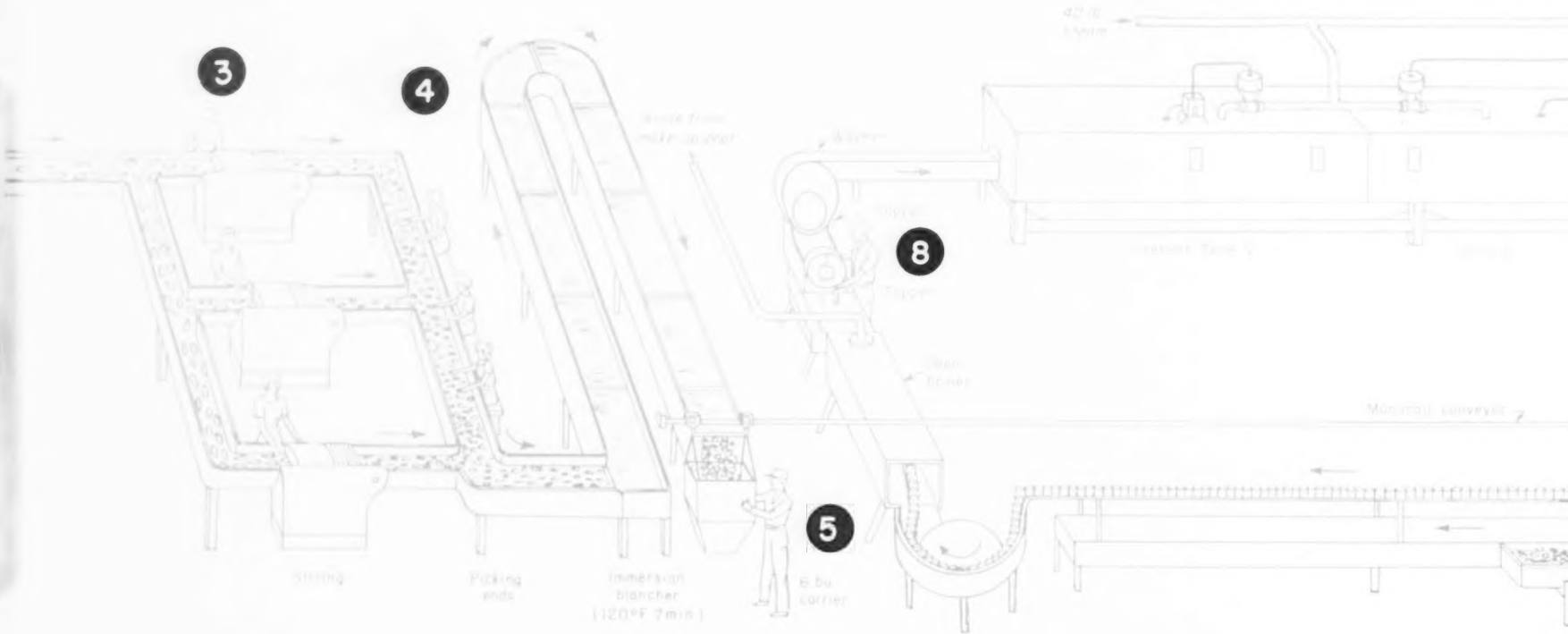
At the end of blanching, the product elevates from its bath and is loaded into a four-compartment 6-bu.-capacity

3 **SLICERS** in parallel quickly reduce hand-oriented cukes into the bread-and-butter disks.



4 **IN BLANCHER** (left), chain-driven paddles carry the pickle slices through a hot salt bath.

5 **MONORAIL-BORNE** gondola discharges blancher, rolls 6-bu. batch to packing area.



gondola-type carrier–Point (5). Monorail-borne, this carrier is rolled (as illustrated) into the packing area and selectively bottom discharged onto any of 12 stainless-steel hand packing tables. Two gondolas, operating in sequence, permit continuous loading and unloading.

Empty jars, extracted from cartons at the far end of the packing area, are belt-conveyed past three girls who dip fixed amounts of dry spices into each container. Typical additions are onion flakes, celery, and mustard seed. The "spiced" jars then pass along to the packing tables and are hand filled. Two inspectors on the line check-weigh every tenth jar.

Filled jars are placed on an upper conveyor and this routes through an open brine, where an overflowing "head" of sweet spiced liquor is applied by overhead pipe nozzles. Brine is made up remotely in an 85-gal. batch mixer–along with sugar, vinegar, and spices–and is pumped from sequence-emptied 100-gal. steam coil-heated storage tanks.

Next in line is a fixed-level "plunger" that sets the head space in each jar by displacing brine. Passage through an automatic capping machine follows, and the jars then travel into a hot-spray washer before entering the continuous pasteurizer.

The steam-atmosphere type pasteurizer–Point (9)–is 80 ft. long and divided into five zones, each with separate temperature controls. Jars travel through the unit on a moving screen and are cooled in its final sections by water from overhead spray nozzles.

A tachometer measures belt speed, permitting fast and accurate adjustment of the conveyor variable-speed drive to suit various size containers and products (8 oz. to 1 gal. size packages can be handled in almost uninterrupted fashion).

After pasteurization and cooling, the jars pass through two labeling machines and are packed–24 to a carton–and belt moved to shipping. Semi-trailers carry surplus pack to the company's warehouse in Minneapolis.

LIST OF EQUI

(Unit, Capacity, a

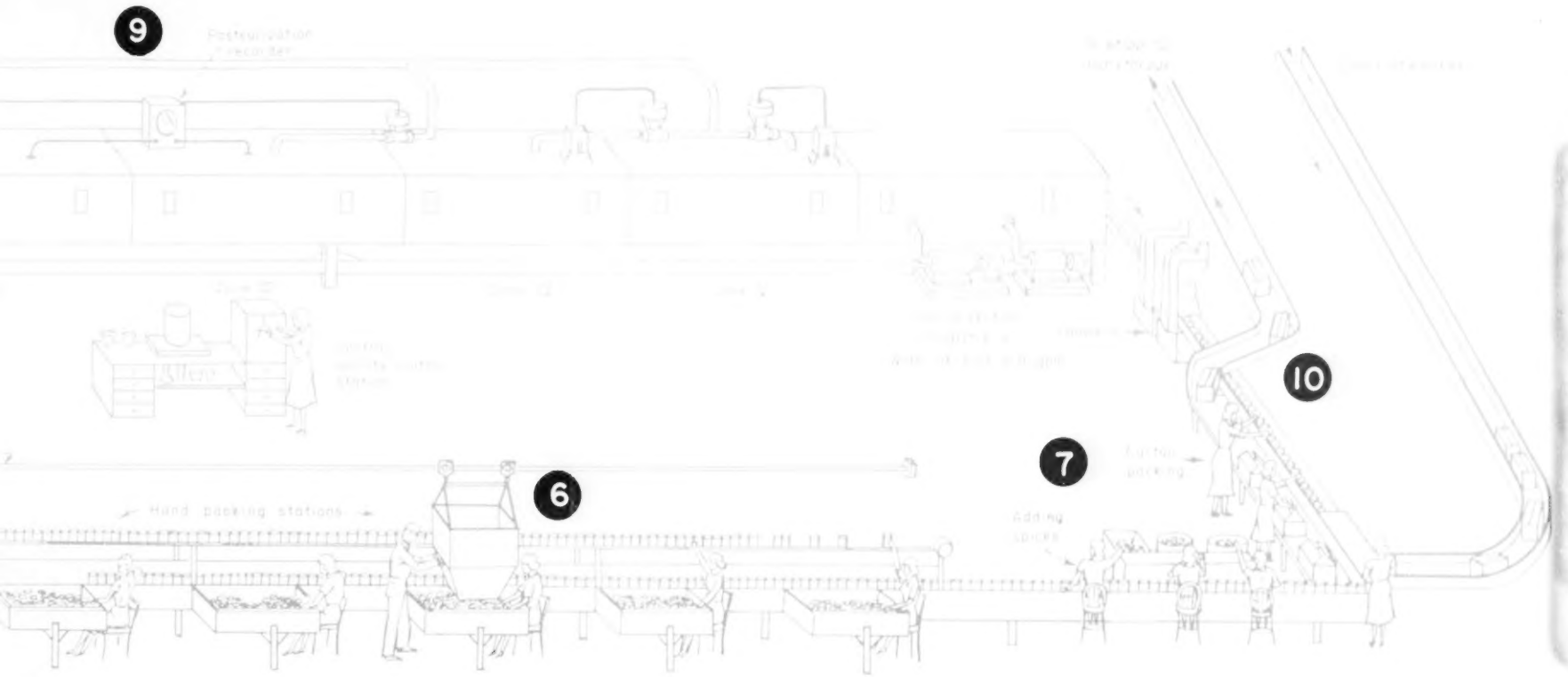
Cucumber grader (100 bu./hr.)—*Stand'd Mach. Co., Providence, R. I.*
High pressure pump (300 psi.)—*Lynn Pumps, Minneapolis*
Slicing machines (30 bu./hr. per unit)—*Chisholm-Ryder Co., Niagara Falls, N. Y.*
Cucumber-moving belts—*Link-Belt Co., Minneapolis*
Immersion blancher (100 bu./hr.)—*(Made by processor)*
Monorail carrier (6 bu.)—*(Made by processor)*
Packing tables (2 bu. cap.)—*Standard Metal Products Co., Chicago*
Jar-moving belt—*Standard Metal Products Co., Chicago*
Brine make-up tanks (100 gal. cap.)—*(Made by processor)*

cher,

6 **HAND-PACKING** tables are periodically supplied with pickles by the rail-borne carrier.

7 **SPICES** are added to empty jars at start of belt moving the containers to packing stations.

8 **BRINER** employs overhead spray to fill jars. Next come topping and capping units.

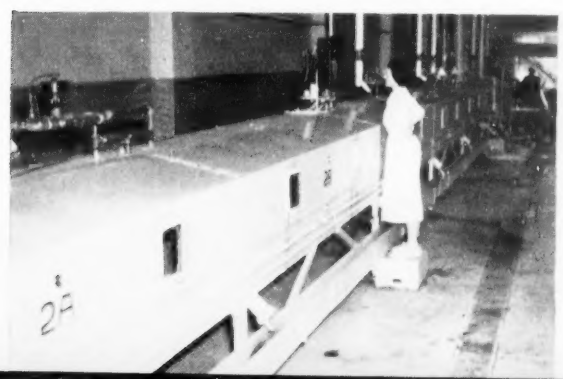


EQUIPMENT

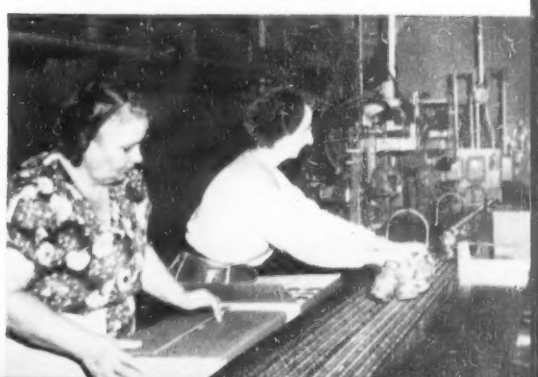
city, and Maker)

Briner—*White Cap Co., Chicago*
Headspacer—*White Cap Co., Chicago*
Capper (400/min.)—*White Cap Co., Chicago*
Jar washer—*Standard Metal Products Co., Chicago*
Pasteurizer (5,400 qt./hr.)—*Standard Metal Products Co., Chicago*
Automatic controls—*Minneapolis-Honeywell Reg. Co., Philadelphia*
Water pumps—*Goulds Pumps, Seneca Falls, N. Y.*
Labeling machines—*New Jersey Machine Corp., Hoboken, N. J.*
Carton conveyors—*Rapids-Standard Co., Grand Rapids, Mich.*
Steam boiler (65 hp.)—*Erie City Iron Works, Erie, Pa.*

9 **PASTEURIZER** is 85 ft. long, has five automatically controlled heating zones.



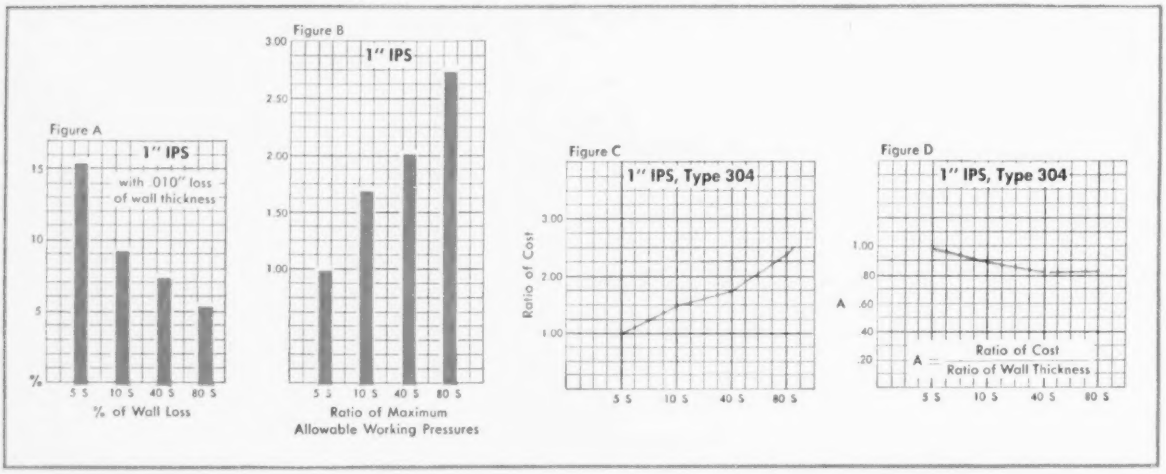
10 **CARTONING** of jars after labeling (rear) permits a final visual inspection of product.



take a closer look at

Stainless STEEL PIPE SIZE Schedules

Don't be "penny wise and pound foolish" where stainless steel piping is concerned. The most economical choice does not always imply the least initial cost as working pressure, methods of joining, installation costs and allowance for loss by corrosion are critical factors. This is particularly true where costs resulting from failures in service—replacement of equipment and lost production due to down time—may exceed the initial cost of the piping.



CORROSION RESISTANCE

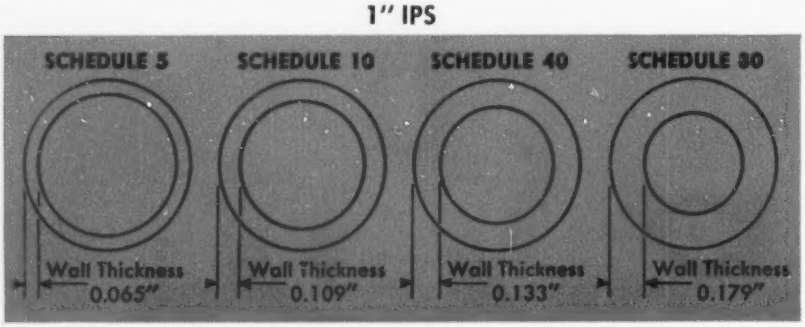
For long service life it is advisable to allow for some loss in wall thickness where stainless piping is employed to combat severe corrosion. As shown in Figure A even a small loss means an appreciable percentage loss of wall thickness in the lighter weight schedules.

WORKING PRESSURES

As shown in Figure B, the heavier pipe schedules permit higher working pressures, thus perhaps permitting the use of smaller diameter piping, or offering greater flexibility for subsequent changes in operational procedures.

COSTS

Although the lighter schedules cost less, as shown in Figure C, you actually get more for your money with the heavier schedules because the ratio of increase in cost is less than the ratio of increase of wall thickness (Figure D).



Methods of Joining & Installation Costs

From the standpoints of economy and ease of installation, it is extremely important that attention be given to methods of joining, fittings, etc. because:

1. Schedule 40 IPS is the lightest weight pipe specifically designed for threading.
2. Fittings which provide a good thread and also afford structural strength at the joint are not commercially available for lighter weight pipe.
3. Field welding of thin wall pipe is difficult.
4. Misalignment of connections can cause high installation costs.

While various types of fittings are available for the lighter weight pipe schedules, they should be examined carefully as to initial cost, installation cost, working pressure permitted and ease of adaptation to existing lines.

Whatever your stainless piping problems, Mr. Tubes—your B&W Tube representative—can provide valuable assistance. Consult him for advice on the stainless piping or tubing that will afford optimum cost-life ratio under your service conditions.

TA-1709(G)

B&W SEAMLESS and WELDED TUBES

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

For more information, use coupon on page 213.

FOR SEVERE THROTTLING AND FLOW CONTROL SERVICES . . .

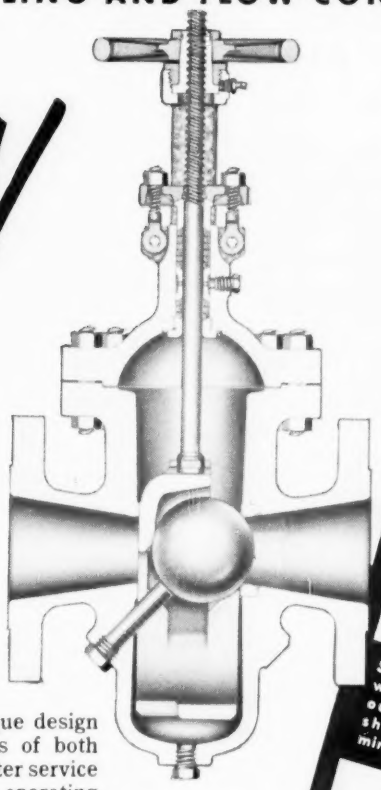
NEW

CRANE-PAUL
Venturi-Ball
VALVES

(Patented and Patents Pending)

CAST STEEL OR CRANE 18-8Mo ALLOY

Outside Screw and Yoke—Flanged. Available with sliding stem for assembly with power operators.



Fully closed with ball disc locked in outlet port. Ball seldom seats in same position, thus minimizing wear and erosion.
Smooth opening begins when ball cage "rolls" ball out of its seat. Crescent shape opening permits minute throttling.
Inclined surfaces in the cage lift the ball disc clear of the seating surface.
Fully opened with U-shaped bottom of cage bridging the gap in body to form a continuous flow passage.

Meet the Crane-Paul Valve—a unique design that combines desirable advantages of both gate and globe valves. It provides better service and longer life under more rigorous operating conditions than such valves normally stand. These features include—

Exceptionally accurate throttling with a minimum of wear and erosion, resulting in long-lived seating surfaces.

Straight-through, non-turbulent flow—with pressure drop characteristics approaching those of venturi-type gate valves.

Smooth, easy response throughout the entire range of operation.

Completely tight shut-off.

Heart of this new Crane-Paul Valve is a precision-ground ball disc which rides loosely in a cage direct-connected to the valve stem. In operation, the ball is moved to and from the center of flow and rolls into and out of the body seat. At no time during valve operation does the ball spin or chatter, even in closely throttled positions. It revolves just enough to provide a new seating surface each cycle. In the closed position, part of the ball actually protrudes into the outlet port where it is tightly seated by the wedging action of the ball cage.

Literature Sent on Request

Full information on this new Crane-Paul Valve is in your Crane 53 Catalog. Literature is available from your Crane Representative or on request to address below.

Cast Steel
150-Pound, Sizes 1 through 6"
300-Pound, Sizes 1 through 8"
600-Pound, Sizes 1 through 4"

Crane 18-8Mo Alloy
150-Pound, Sizes 1 through 6"
300-Pound, Sizes 1 through 8"

CRANE VALVES

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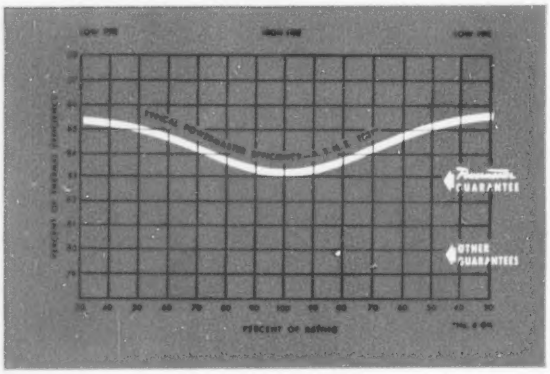

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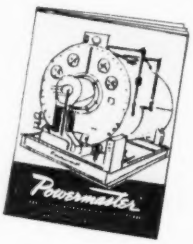

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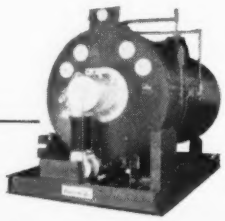

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FOR REAL HELP TO SMALL BUSINESS

It is ironic that one of the first jobs of the Eisenhower administration, so widely, and erroneously, tagged as a "big business" administration, must be to go to the relief of small business. This is necessary because the preceding administration, while continually proclaiming its tender regard for small business, actually impaired gravely the ability of small business to carry on successfully. This it did in the necessary haste of devising an emergency tax program to finance rearmament and the Korean War. Now the new administration must revise this tax structure to give small business a chance to make its key contribution to an expanding American economy.

How Taxes Hurt Small Business

Since the outbreak of the Korean War, small business has been handicapped by two principal features of the emergency tax program:

1) Many small firms are unable to retain enough of their earnings to provide for expansion because these earnings are drastically limited by the excess profits tax.

2) Small companies have received a very small share of the tax concessions allowed by the federal government to encourage construction of defense facilities.

A small business that succeeds and hence grows is particularly hard hit by the excess profits tax. That tax, of course, applies to corporations having a net income of more than $25,000 per year. It results in taking up to 82 cents on every dollar of profit that the company earns above what is called an "excess profits credit." For most small companies the credit depends on what was earned in 1946-49. This creates an element of gamble and discrimination in determining the amount of tax to be paid. Time has proved that it is impossible to select a base period for the tax that is fair to all companies. A young company starting in 1946-49 is peculiarly vulnerable, as its earnings in that period were necessarily low. Even on modest earnings today, it would pay a high excess profits tax.

It is true that Congress wrote into the excess profits tax law provisions to lessen the impact of the tax on growing companies. However, none of these provisions in practice has given much relief to small business.

"Relief" Provisions Give Little Relief

Small firms rely almost entirely on retained earnings to provide funds for improving their plants and equipment. They get very little help from the provisions (1) that no more than 70 per cent of total profits can be taxed away, (2) that additional earnings are allowed on an increase of invested capital or (3) that growing companies are allowed a

rate of return on capital equal to the industry average.

Most large firms can obtain additional funds in the securities market. But small firms find it difficult to increase their capital by selling securities, since investors generally prefer the stocks or bonds of nationally known and seasoned companies. Few small companies, therefore, can reduce their tax burdens by increasing their invested capital, and few can meet their needs for equity capital if their rates of profit are no higher than those of the leading companies which generally set the average profit.

Small business has been equally at a disadvantage in the matter of accelerated depreciation for tax purposes. The government has encouraged a great expansion of our industrial plant, despite the very high rate of taxation on corporate earnings, by granting certificates of accelerated amortization on new plants built to support the defense program. These certificates allow business to charge off the cost of defense plants at a rapid rate. This decreases the earnings that are subject to taxes, and so increases the part of the earnings that may be retained in the business.

Growth is Stifled

But most of these tax concessions have been made to large firms especially equipped to handle the complex problems of defense production. Of the $12 billion of new facilities so far approved for fast amortization, only 11 per cent are for companies with less than 500 employees, although the share of such companies in the normal civilian business is about 30 per cent. In only 2 of 12 industries studied by the Small Defense Plants Administration were small firms receiving what was estimated to be a fair share of the total tax amortization awarded.

Because they are unable either to retain enough earnings after taxes or to step up their depreciation allowances, most small firms are unable to keep up in the race to expand and modernize plant capacity. The Small Defense Plants Administrator, in his report to Congress, emphasized that small companies have been unable to do their full part in the defense program for lack of capital.

The Council of State Chambers of Commerce recently published an eight-state survey showing widespread cutbacks of plans for new plants by small and medium-sized companies. According to this report, "high federal taxes enacted since the beginning of the Korean War appear to be placing an effective brake on the rate of industrial expansion in all the states surveyed and probably in the 48 states generally . . . It is principally the small and medium-sized companies whose growth is being stifled."

Some Ways to Help

The first step to relieve small companies should be to free them from the excess profits tax. The nation as a whole would be far better off if the excess profits tax were allowed to die as scheduled on June 30, since the tax promotes waste as it stifles incentives. It is quite possible, however, that the politics of tax reduction, as opposed to the economics, will prevent the elimination of the tax during 1953.

If the tax is extended, provision should be made for a much broader exemption to smaller corporations. If net income up to $100,000 a year, which in these days still constitutes small business, were exempted from the tax, the loss of revenue to the government would be about $175 million. This relatively small amount could easily be offset by an increase in employment and incomes if small business is freed from its financial strait jacket and allowed to expand. Careful attention should be given also to the possibilities of allowing a higher rate of return on the first $1 million of capital (roughly the amount it takes to provide 100 jobs) and of making special accelerated depreciation allowances to smaller firms. This is a matter so important that we shall return to it in a future editorial.

Relief for small business—relief from a financial paralysis that has kept it from playing its dynamic part as a growth element in our economy—would do much to give the lie to the notion that the Eisenhower administration is a "big business" operation. Much more important, it would be a long stride toward releasing the dynamic energies of many small businesses and businessmen to forward a continuing and expanding prosperity.

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Stable Whole Wheat Base

—Continued from page 79

As a matter of fact, the new product is so desirable, and its process so practical, that it is currently being considered for the commercial market.

A "formulation" of germ, bran, and shorts (that portion of wheat kernel removed during milling of white flour), was the experimental approach almost from the beginning. And since the impracticability of attempting to heat-process the whole wheat flour *in toto* was early evident, it was logically decided to fractionally stabilize and subsequently recombine with white flour.

Methods Developed

Wheat bran, germ, and shorts were recombined according to the formula in Table I, which roughly approximates that obtained during the milling of white flour.

Ingredients were uniformly mixed, spread on trays, and the combination then heat processed for 1½ to 2 hr. under 12 to 18 psi. steam pressure. The heat-processed mixture then was dried at a temperature of not more than 200 deg. F. to a moisture content of 8 percent or less.

Final step of the process was a comminution to reduce the stabilized base to a particle size suitable for baking. So this standard was set: All material must pass through a U.S. No. 12 sieve; at the same time, not more than 10 percent is able to pass through a No. 50 sieve.

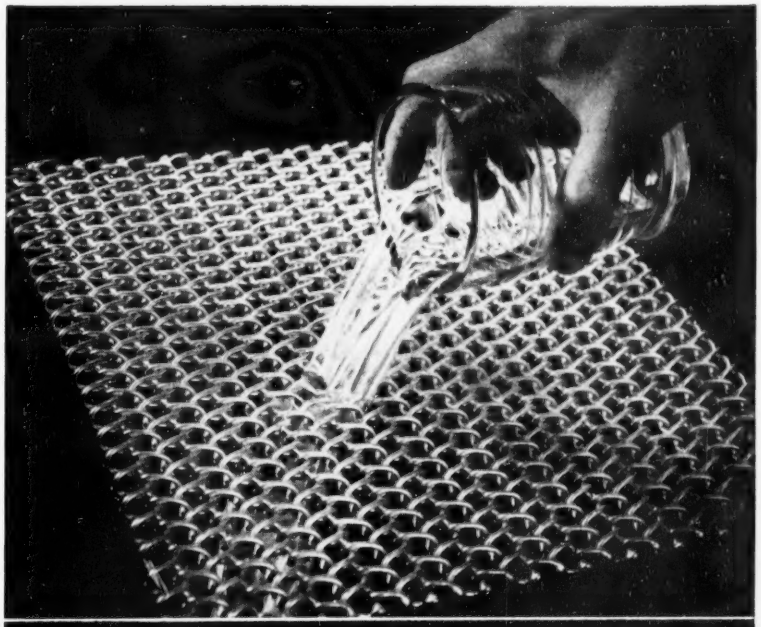
Since foods destined for use by the armed forces should withstand storage for six months at 100 deg. F., the stabilized base was placed in an air-tight container and stored at this temperature. It was then examined at three-month intervals, and no change in odor, flavor, appearance, or baking quality was subsequently noted.

As a matter of fact, wheat base already has been stored in room temperature for over 2½ yr. without any noticeable changes in these properties.

Taste Panel Results

Next step was to establish the relative taste acceptance of various products made with the stabilized wheat base[2] and then compare these scores

[2] To approximate the chemical composition of wheat flour, it was necessary to add two parts of wheat base to eight parts of white flour. However, since military wheat bread is made from a 50-50 blend, this practice was more nearly duplicated by a blend of one part of wheat base with nine parts of white flour. Thus, the work related here was accomplished with a nine-to-one blend.



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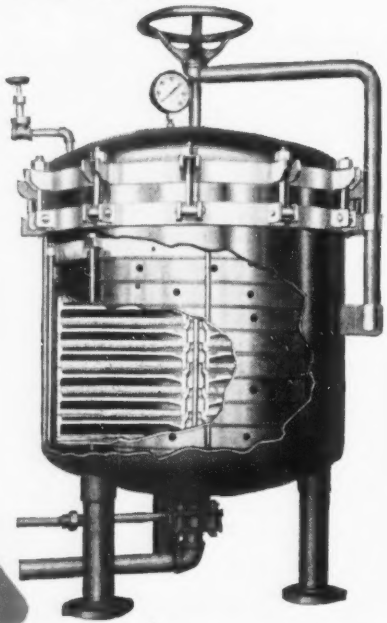

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with those accorded products made with regular wheat flour.

To accomplish this, a field test was run at Fort Lee, Va., comparing products. And the results verified the laboratory preference tests, which showed that products made with wheat base were just about equivalent to those of wheat flour (see Table II).

For his work on wheat base, Mr. Cryns was recently presented with the annual Research Director's Award of the Research & Development Div., OQMG.

At the present time, the excellent commercial possibilities of the products are being investigated and a patent application has been filed by the inventor.

End *(Resume reading on page 80)*

Schlitz Defeats Dust

—Continued from page 63

in the dust house, and the dust it collects is emptied into the bin below.

Collecting Bins

All dust finally reposes in one of three 14-ft. circular collecting bins standing below the filters in the dust house. Two 9-in. screw conveyors and spouting deliver from the choke boxes below the battery of filters. One of these bins, however, receives only chaff that is delivered by screw conveyor from the cleaning process.

A newly patented Day device (U.S. No. 2,604,238, July 22, 1952), consisting of a series of disks inside the bin, keeps the material from packing. Nine-inch twin-screw feeders below the bins deliver to a 12-in. spout serving a pneumatic loading-out system that blows the chaff in boxcars for use as feed.

In all, eight main dust-collecting duct systems are served by the ten cloth filters. These are: (1) System serving tripper in storage gallery and basement belt. (2) System piping up dust from basement of headhouse. (3) System from headhouse above first floor. (4) Car-dumper system. (5) Scalperator system. (6) System serving the two separators. (7) System serving the two cleaners. (8) System employed in loading-out of grain.

In addition to these main functions, there are occasional suction connections to screw conveyors to relieve pressure on the conveyors. And a central suction is provided, running right through the headhouse, which permits a floor-sweep of dust. Also, a Spencer direct-coupled vacuum cleaning system aids housekeeping.

End *(Resume reading on page 64)*

LETTERS TO THE EDITOR

Critical Comments On Ultrasonic Brewing

Editor, FOOD ENGINEERING:

The article by Schroder, "Sound Waves Save Ingredients", in February FOOD ENGINEERING, is especially interesting for its illustrations of the ultra-sound equipment. These have not appeared very often, though the process has been studied for some time in a number of European breweries, and a number of papers on its effects have appeared in the continental brewing journals.

A few studies on the effects of sound in American brewing processes have also been made and others are in progress. Up to now, the chief interest in Europe has been the effect of ultrasound on hop-bitter extraction, and the 40 percent figure quoted by Schroder seems to be the maximum sparing of hops if the beer is to have normal hop-flavor. Normal composition and stability has been claimed for the beers, though it seems odd that the ultrasound effect should be so highly selective that nothing except the hops is affected! Its effect on proteins is now being investigated by workers in the U. S., and at least one such study has been reported.

A few misconceptions in the Schroder article need some correction: Ultra-sound treatment in the kettle does *not* produce a pasteurized beer, though greater chill-proofness is claimed for the pasteurized beer finally obtained from the "ultrasonated" wort.

A brewery producing 85,000 hectoliters of beer a year (72,000 bbl.—a small brewery by U. S. standards) would use about 72,000 lb. of hops at the usual German hopping rates. If 40 percent of this usage could be eliminated, the saving in hops would amount to about 30,000 lb., worth $15,000 to $20,000 at current hop prices. Hop usages in the United States and Canada are less than in Germany, the current average for the U. S. being about 0.39 lb. per bbl. There may be some doubt, therefore, about the reduction of hops in American beers by the application of ultrasonics. If it could be done, a 72,000-bbl. brewery using 25,000 lb. of hops a year might save about $5,000 a year on its hop costs.

The brewing process mentioned in the Schroder article (on page 49) has been oversimplified beyond recognition. *Boiling* water and malt at 75 deg. C. for 4 to 6 hr. is a good trick if you can do it, but it is not likely to lead to a very fermentable wort! A temperature of 75 deg. C. (60 deg. R.) is about the maximum reached in mashing operations, and it is used to finish off the mash after the starch and protein conversions have taken place a around 50-63 deg. C. (40-50 deg. R.). Most mashing cycles are completed in an hour or two, even in Germany. Wort is clarified as it drains from the grains which act as a filter medium, and hops are usually not added until the wort begins to boil.

One thing about these ultra-sound apparatuses has not been very clear in any of the reports about them, and that is their watt-rating. Does the rating of an "ultra-sound capacity of 300w." mean that the ultrasonator requires 300w. to operate it, in the same sense as a 300w. lamp, or does it mean that it puts 300w. of sound energy (per unit of time) into the kettle in which it is inserted?

Now that ultra-sound producers are being made large enough to produce

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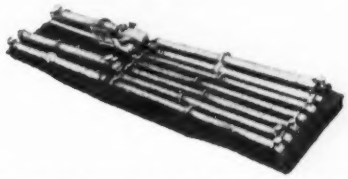
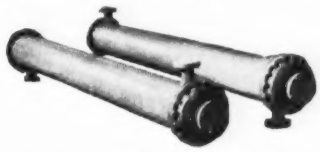


One of six carloads of Heat Exchangers, Coolers, Condensers and Reboilers designed and fabricated by our Heat Transfer Division. Materials used consist mainly of Type 304 Stainless Steel.



Two of four Steel Shell Condensers with Ampco 8 Heads and Tube Sheets. These condensers were built for export to the Middle East.

This condenser is 16" Dia. x 12' tube length; Bundle ¾" O.D. type 316 Stainless tubes; Double tube sheet also of type 316 . . . manufactured by the Heat Transfer Division of DOWNINGTOWN.

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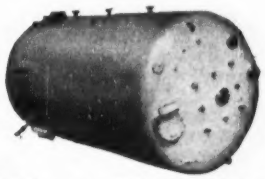

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ultra-sound waves in industrial-sized containers, it will be most interesting to see what new applications for them can be found.—*Earl D. Stewart, Schwarz Laboratories, Inc., White Plains, N. Y.*

Answer to Letter

Regarding the comments made in the above letter concerning the article "Sound Waves Save Ingredients"—

The article did not state that the ultrasonic equipment pasteurizes the beer. This statement concerns the final product. Starting at the first line on page 49, the article says that the unit "performs no miracles aside from the impressive saving in hops." There is no saving in fuel, time, or labor—the brewing process has remained the same.

The simplified description of the process, as given on page 49, contains one error. The mixture is heated, not boiled, and the correct temperatures are as given in the above letter. The 75-deg. temperature, as stated in the article and in the letter, is a maximum.

The 300w. referred to is the ultrasonic energy at the crystal set. However, the amount of energy transmitted to the media being treated would be less, since there are transmission losses through the buffer element to the medium being treated.

The last paragraph of the letter is indeed of keen interest to us. Beer now. What's your guess on the next application?—*The Editors.*

—End—

Receiving Room Efficiency

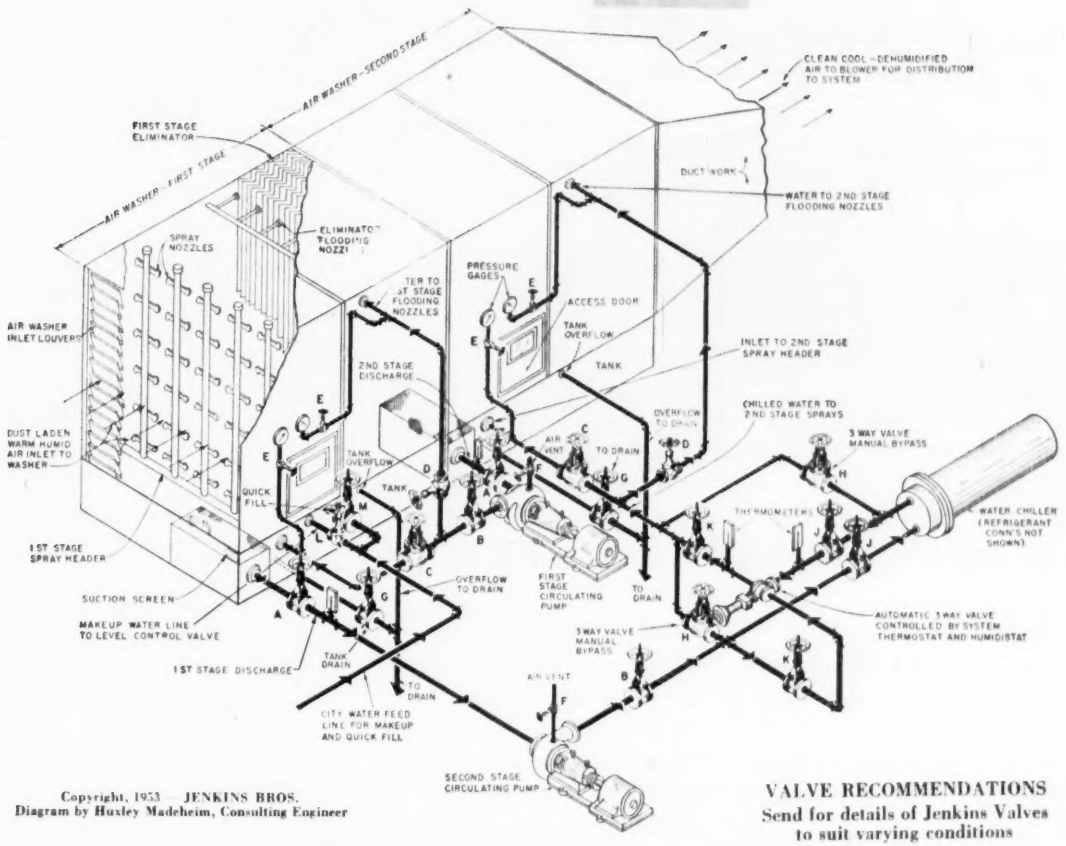
—Continued from page 68

Speed of operation could be increased and work of operator lightened with a foot-operated air valve.

Time for draining the can varied considerably. This could be eliminated with a self-closing valve. Average saving in time would be 0.02 min. per weighing on one-half of the weighings. A 100,000-lb.-per-day dairy would have an average of 330 weighings. Yearly saving would amount to 3.3 min. per day x 365 days x 3 men, or 60 hr. At 1952 prices, 3 yr. would be required to pay for the additional cost ($315) of the self-closing feature of an air-operated valve.

Sampling is usually done manually with a small hand dipper, but it can be done mechanically with a vacuum unit. Sampling time was found to be 0.07 min. by either method. The vacuum sampler is often given credit for quicker work, but when the techniques are poor, it often requires as

JENKINS PRACTICAL PIPING LAYOUTS 66



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C	2	Fig. 142, I.B.B.M. Globe	Spray Header Control
D	2	Fig. 956, Bronze Globe	Flooding Nozzle Control
E	4	Fig. 741-G, Bronze Needle	Pressure Gage Control
F	2	Fig. 741-G, Bronze Needle	Pump Air Vents
G	2	Fig. 651-A, I.B.B.M. Gate	Tank Drains
H	2	Fig. 142, I.B.B.M. Globe	3 Way Valve Manual By-Pass
J	2	Fig. 651-A, I.B.B.M. Gate	Water Chiller Shutoff
K	2	Fig. 651-A, I.B.B.M. Gate	3 Way Valve Shutoff
L	2	Fig. 47, Bronze Gate	Feed to Level Control
M	1	Fig. 651-A, I.B.B.M. Gate	Tank Fill Valve for Start up

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much as 0.05 min. longer for sampling by this method than by the manual dipper method. It isn't necessary to justify the additional cost of the vacuum sampler by a saving in labor, however, because the operator's work is lightened.

Receiving tank should be large enough to permit continuous dumping without delay, which is usually two to three times that of the weigh can. Although usually not attained for a period of over 15 min., maximum rate of dumping for an average of five cans per producer is 7.1 cans per min. x 60 lb. per can, or 25,560 lb. per hr. In the plants studied, a 1,500-lb. receiving tank was large enough for the 750 lb. weigh can, and the 1,000-lb. one for the 500 lb. weigh can.

Conveyors

Design of conveyor equipment will often limit efficiency of other operations in the receiving room.

In most plants where both gravity and power conveyors were used, cans tended to lodge at the junction of the two. At the unloading platform, conveyors should be set at the same level as the truck bed, or slightly above, to facilitate unloading of cans. Incoming conveyor should be close to empty can conveyor at the dump position if the dumper is checking for quality, with a short reject line in between.

In some plants, considerable difficulty was encountered from cans pinching at the dump, particularly when they were dumped in the direction of conveyor travel. Least difficulty was observed when cans were dumped at a right angle to the conveyor (see photo p. 67).

Length of conveyor varied greatly from plant to plant. An analysis of the optimum length is summarized in Fig. 1. Results are based on receiving a 100-can load, with the trucker unloading cans and loosening lids at rate of 7 per minute. Two minutes were allowed to move truck from unloading position to empty can conveyor. A conveyor speed of 15 cans per min. (cpm.) was assumed. Time for emptying cans—for incoming conveyor lengths from 0 to 90 ft. and for different dumping rates—was calculated and plotted. Total length was obtained by adding length of incoming conveyor to length of empty can conveyor—figuring latter to be sufficient to prevent accumulation of empties, which would slow down dumping rate. Can washer was considered to be part of empty can conveyor in measuring length.

For a dumping rate of 6 cpm., dumping time is constant, regardless of length of incoming conveyor.

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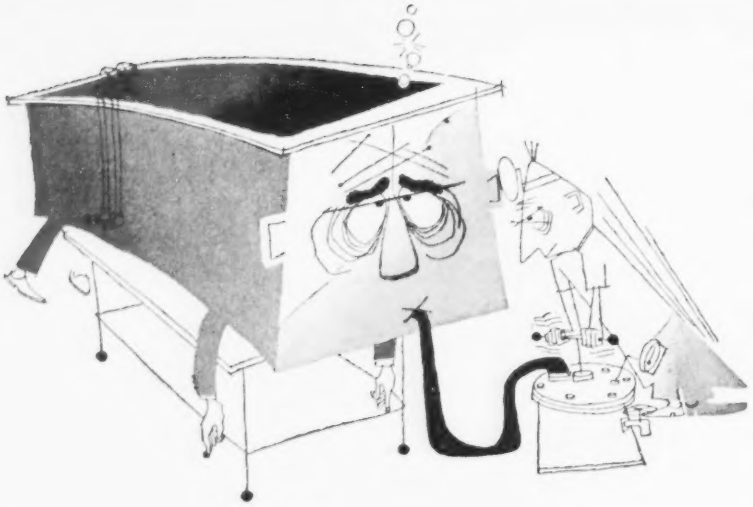

has coil-itis* cramped your production flow?

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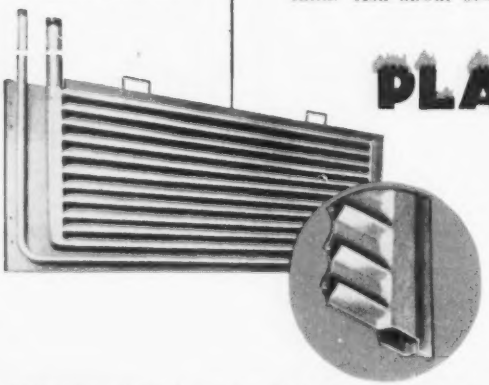

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Coil-itis — Diagnosed as tank heating and cooling problems. **Platecoils** — the prescription for solving pipe coil problems.

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Whenever dumping rate is slower than speed at which trucker can unload, there is no advantage to a long incoming conveyor.

There is a very interesting and important relationship between conveyor length and dumping time when dumping rate exceeds that at which cans are placed on the conveyor. For example, for a dumping rate of 8 cpm., time is reduced from 14.3 to 12.5 min. as conveyor length is increased from 0 to 30 ft. When incoming conveyor is 30 ft. long, a total conveyor length of 130 ft. is required. As length of incoming conveyor is increased from 30 to 90 ft., time required for dumping does not change, but total length of conveyor decreases from 130 to 118 ft.

Also, as length of incoming conveyor increased, number of cans remaining on the truck decreased. Thus, the trucker could unload, move to the empty can conveyor, and remove empties sooner than if a short incoming convevor is used. Total conveyor length is decreased as the length of incoming conveyor is increased beyond 30 ft. for a dumping rate of 8 cpm.

In a large operation with more than one man in the receiving room, and where trucks arrive on a schedule that prevents delay, the trucker can unload cans at a rate of 10 per min. That is without loosening lids. Another trucker can loosen them. This rate is adequate to keep the dumper supplied with cans in most operations.

If the truckers cannot help each other, a double incoming conveyor could be constructed with a Y-feed at the dump. Two trucks could be unloaded at the same time, although the dumper would take only one load at a time. Such a procedure would require long incoming conveyors.

Long empty-can conveyors often cause the driver to wait an excessive length of time for the empty cans for small loads. This causes particular difficulty in the spring of the year in Michigan, when he may have to haul half-loads because of highway load regulations. A long conveyor may require 8 min. for the cans to travel its length. To speed delivery to the truck, drivers would often lift cans over one of the conveyor loops so that they would travel only half the length of the empty can conveyor. A cross-over could be designed into such a system to facilitate movement of empties.

Cost of operation of conveyor, weigh can, receiving tank, scales, and dumping accessories is shown in Fig. 2. This includes cost of labor for cleaning equipment and for dumping milk, as well as fixed and operating cost of equipment. This data may be used for comparing present costs

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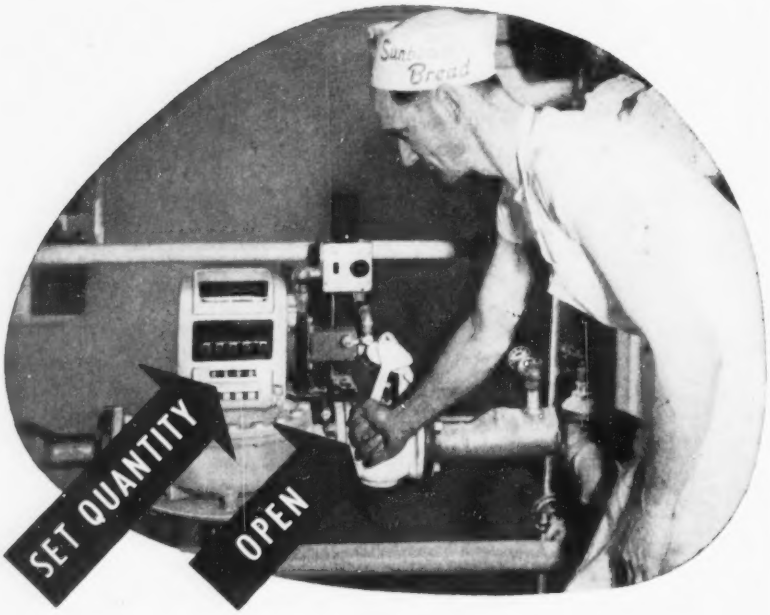

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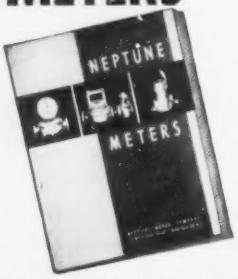
Neptune meters pay for themselves by eliminating spoilage, spillage, over-filling and the unsanitary muss and fuss of gauge sticks, pails or batch tanks. They stop waste of valuable ingredients and prevent over-dilution with water that must later be removed. Their accurate figures take the guesswork out of inventory control too. The Neptune Auto-Stop is only one of many Neptune meters available for handling over a hundred different industrial liquids. Why not ask for a complete plant survey at no obligation?



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with proposed costs of such operations as bulk handling of milk.

Capacity of can washers varied greatly in different dairies, ranging from 6 to 14 cpm. Size of washer which should be installed is limited by rate at which cans are dumped. The one-man operation was much more efficient than the two- or three-man operation for receiving. One man can easily handle up to 80,000 lb. of milk per day. Even though more labor (usually expressed in man-minutes per 100 cans) is required for large receiving stations, it may be imperative to speed the operation.

Rate of dumping, where speed of unloading cans from truck and the size of weigh can are not the limiting factors, may be calculated (Table I).

Capacity of can washer must be greater than dumping rates. While sampling, weighing, and recording is being carried out in the one-man operation, there are no cans fed into the washer. It is not used to capacity during the weighing and sampling operation for two- or three-man operations. Table II gives size of can washer necessary to permit desirable dumping rates.

From the previous data it is evident that the 8 or 10 cpm. washer will suffice for a typical one-man operation in Michigan. A larger washer cannot be justified. It would be an uneconomical investment. A 6 cpm. washer would be too slow to utilize fully the dumping ability of one man. A 12-can unit would be recommended for a 2- or 3-man operation.

Data in Fig. 3 can be used to select an economical straight-away can washer. Size of dairy is considered in determining correct selection. Labor requirement charged against the washer includes preparing the unit for operation, cleaning the area between loads, and cleaning washer.

In addition, if the washer does not move the cans through as rapidly as the worker can dump them, a charge is made against it. For example, if a worker can dump 7.1 cpm. in a particular dairy, and a 6 cpm. washer will handle an average of only 5.5 cpm., the difference in time is charged against the washer.

The overall labor efficiency in the receiving room can be expressed in terms of the man-minutes required to handle 100 cans, which represents an average trucker's load. Results at several dairies studied are listed in Table III along with theoretical expected labor requirements.

The above article is based on a talk before the 1952 meeting of Milk Industry Foundation in Chicago.

End *(Resume reading on page 69)*

BACK IN THE 1880's

WHEN WORLD ASTRONOMERS FIRST PHOTOGRAPHED THE HEAVENS

Koven

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Even before astronomers were photographing celestial satellites, L. O. KOVEN was focusing careful attention on the specialized needs of the Food Processing Industry. And today—KOVEN Individualized Equipment is being used in leading food plants throughout the country—where speed and efficiency are indispensable to increased output demands.

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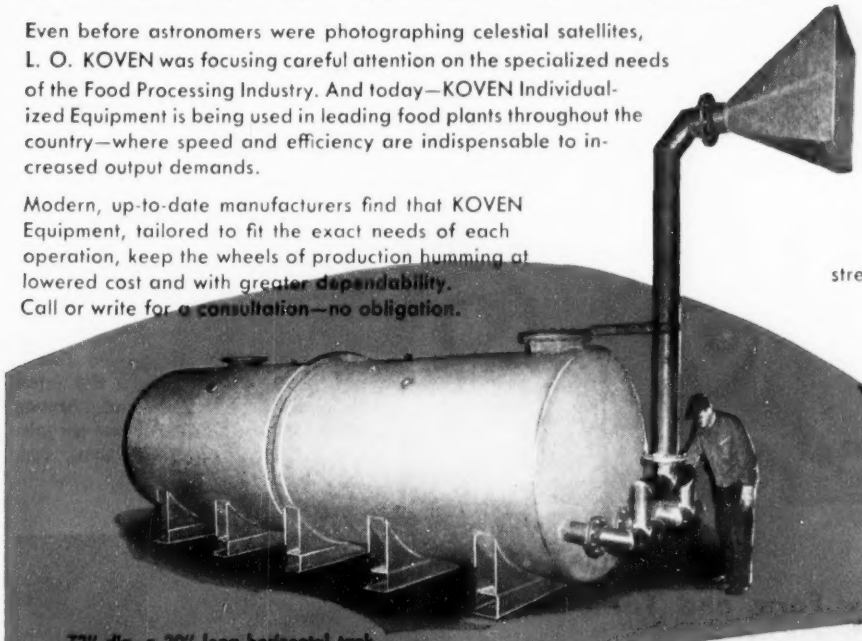
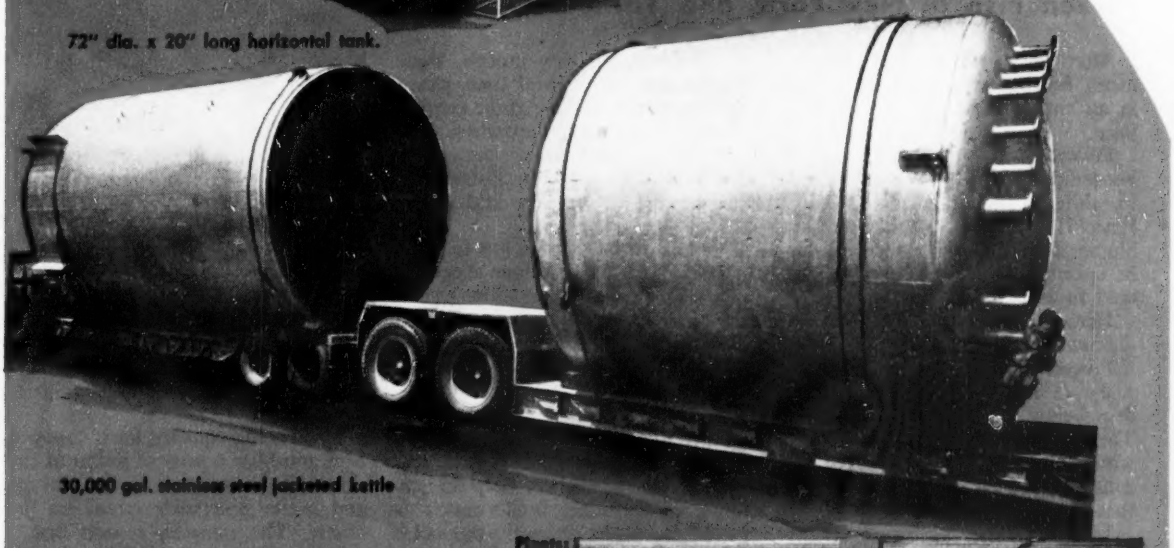


72" dia. x 20" long horizontal tank.



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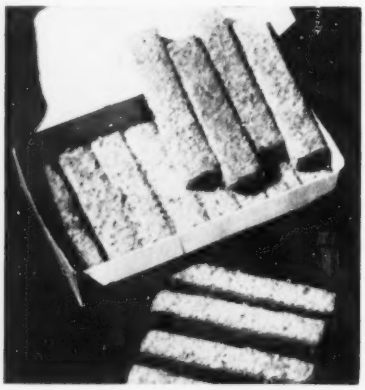
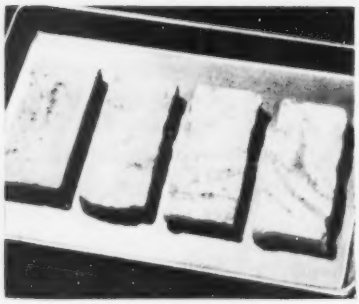


Breaded Sticks



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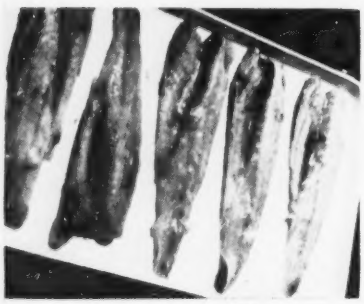

Conventional Fillets

Frozen Fish in New Form and Tailored Sizes

After long research and development, fish products are being offered in an entirely new and revolutionary form.

Following its success in its extreme low-temperature flash-freezing process for shrimps and other shellfish (FE, June '51, p. 160), SeaPak Corp., St. Simons Island, Ga., is now expanding its operations to ocean fresh fish, tailored to users requirements.

Here is what makes these products different:

Process used (same as shrimp): Portions are flash-frozen separately at 60 deg. below zero and then packaged. This makes it possible to cook fish without pre-thawing and also allows consumer to separate and take out only that portion needed.

Uniform sizes: To insure uniform cooking results, a new technique was developed so that all portions would be of varying weight, thickness, size, and quality. Fish large enough to provide desired portions were no problem as they are filleted, trimmed to proper size, flash-frozen separately and packaged. The undersized fillets presented the problem. In new process, these are skinned, boned, and then joined together during freezing at the extreme 60-deg.-below-zero temperature. In this process, the many pieces are closely bonded together. Subsequent thawing and cooking are said not to break this bond.

Various shapes: Cubes (48 to a lb.) and sticks (1 oz.) for hors d'oeuvres and quick snacks; rectangles for regular family servings; squares for sandwiches and "burgers"; round salmon steaks for party meals; and conventional fillets.

Three protective coatings, each designed for a different culinary purpose: Ice-glazed fish for chowders, stews and bouill-baisse; breaded (light milk, egg, and cracker crumbs) for deep-fat, pan frying or sauteeing; broiler-coated (a special process by which the product is coated with a preparation of butter, lemon juice, paprika, parsley essence, and other seasoning), which prevents dehydration and imparts a delicious flavor as well as presenting an appetizing brown to product after broiling.

These products will be marketed under SeaPak label to retail trade, and Aerofoods label to restaurant trade. They will be further identified with the descriptive word "Uni-Serv."

Pilot runs now are being made, and it is expected that plant operations will begin around June 1. Quantities of "Uni-Serv" products are expected to reach the markets about July 1.

Fortune Bay Packers Ltd., Newfoundland company is completing a new modern processing and freezing plant designed to meet the SeaPak process requirements.

This plant will have initial facilities for annually processing upwards of 10,000,000 lb. of seafood on which SeaPak has obtained exclusive rights to the entire production. The Canadian company will catch, process, freeze and package fish to SeaPak's specifications, marketing being handled by the latter company.

Plant is located only four hours from the famous St. Pierre Banks, seven hours from the Grand Banks, and but a half hour from the finest sole areas in Newfoundland. Among species of fish to be processed are sole, flounder, ocean perch, salmon, cod, halibut, and haddock.

Frozen Buttered Steaks

Swift & Co., Chicago, has added to its growing family of quick-frozen meats a new item—buttered beef steaks.

Made of high quality, finely chopped beef, meat has a patty of butter in the center of the top steak in the package and butter generously spread on the others. The company reports that 5 percent of the weight of the package is butter.

Four 2-oz. steaks are wrapped and heat-sealed in moisture-proof cellophane and placed in a multi-colored, top-opening carton.

Institutional 12-lb. packs, containing 96 steaks, are also available.

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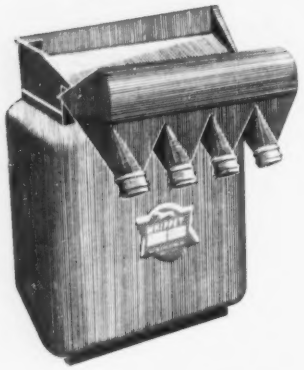

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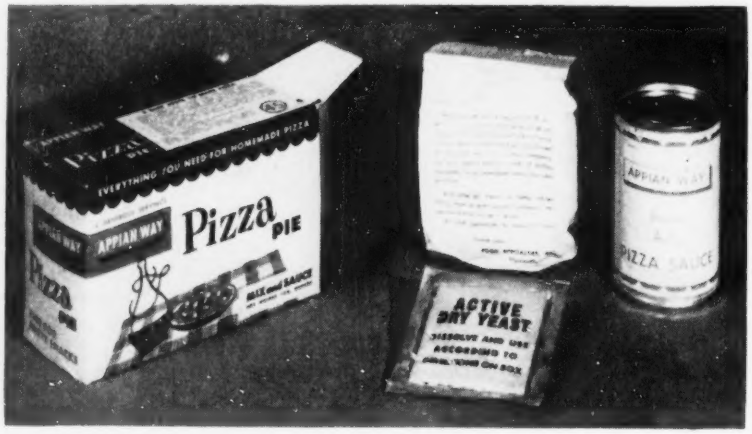
SUTTON, STEELE & STEELE, INC.

Individual "Salties" are Handy and Attractive

Ideal for picnics, lunch kits, or individual table use, are miniature salt boxes being marketed by Morton Salt Co., Chicago.

These cartons, replicas of Morton's regular salt containers are but 1½ in. tall and ¾ in. in diameter. They are packed six to a carton, which is composed of a chipboard tray, overwrapped with cellophane. Each shaker contains ⅛ oz., with the 6-pack container holding 2⅛ oz.

Each small box has a bright yellow plastic "shaker" top and carries the well-known blue, white, and yellow design of Morton's with the familiar "When It Rains It Pours" trademark prominently displayed.



Unit Pack Offers All Pizza Ingredients

With the growing popularity of Italian pizza, Food Specialties, Inc, of Plymouth, Mass., has introduced an easy, ready-to-prepare, pizza package containing everything necessary to make a 12-in. diameter pizza pie. This is being marketed under the "Appian Way" label.

To simplify preparation contents are divided into three units. The pie crust mix, with all ingredients except the active dry yeast, is packaged in a heat-sealed waxed paper bag. Yeast is contained in a heat-sealed laminated foil and cellophane envelope (Shellmar Products Corp., Mount Vernon, O.). Third unit is a 6-oz. can of sauce containing tomato puree, garlic, oregano, black pepper, Italian cheese, cottonseed oil, olive oil and salt. For variety, sharp cheese, anchovies, mushrooms, sausage, pepper, chopped meat, or fish fillets may be added to the sauce.

The three items are packaged in a colorful red, blue, and yellow chipboard carton on which complete instructions are given for preparation.

For Package Data Use Reader Service, p. 213

Artificial Casings

Though hog intestines are ideally suited for sausage casings, they do provide poor size control and are not too appealing to the eye. Now, an artificial

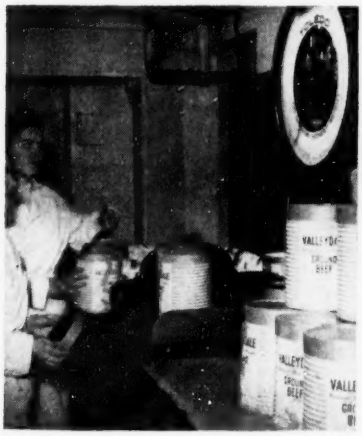
casing has been developed and patented by Transparent Package Co., Chicago.

This is an epon-coated film, called "Controlled Moisture Vapor Permeable or CMVP casing." The epon used is epichlorhydrin bisphenol which will stretch without rupturing. It is transparent, anchors solidly to the cellulose, and hangs onto moisture-proofing ingredients even at high temperatures.

Commercially known as "Tee-Pack", the company makes the cellulose tube conventionally, but engineers a desired stretch to viscose or cellulose molecules. Epon is dip-coated on a matrix of dissolved waxes which give the accurate control of moisture loss (2% a week for liver.)

After three years of development casings were tested on a limited scale last summer. So successful were the results that the company is now turning out 500,000 27-in. casings per month. Tests are now being conducted for its use on ham and loaf items.

For Package Data Use Reader Service, p. 213

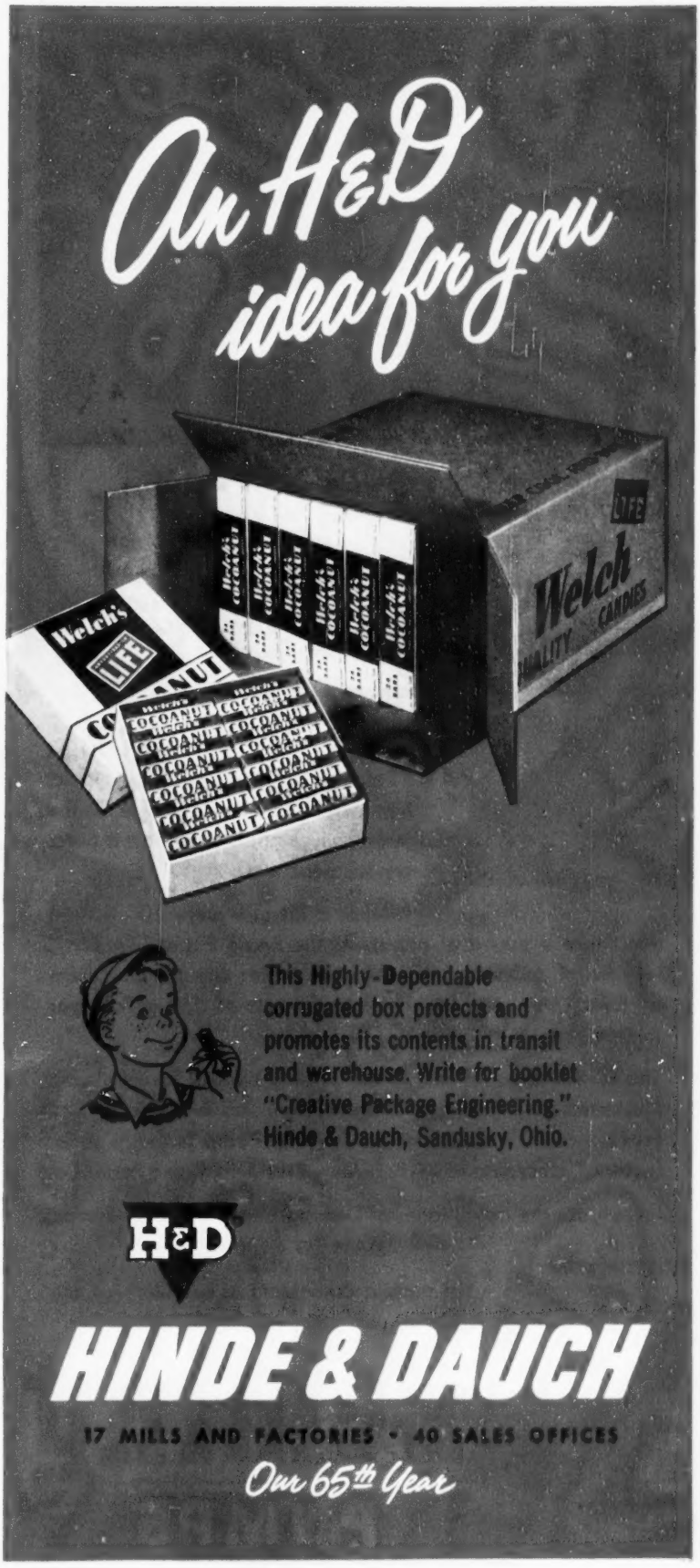


Ground Beef in Bulk Form

Streamlined production and packaging techniques of Valleydale Packers, Inc., Bristol, Va., have resulted in a productive and profitable operation.

The company is now packaging 100 percent trimmed beef, pre-ground through $\frac{3}{8}$ in. plates, and then through $\frac{1}{8}$ in. plates in a 10-lb. heavy paper container. Approximately 4,000 lb. a week are now being sold to retail outlets.

These packs are especially suitable for restaurants and small retail groceries which do not employ full-time butchers, and give the product sanitary protection and good flavor retention. It is claimed containers are leakproof, can be refrigerated, opened, re-lidded and re-refrigerated over and over again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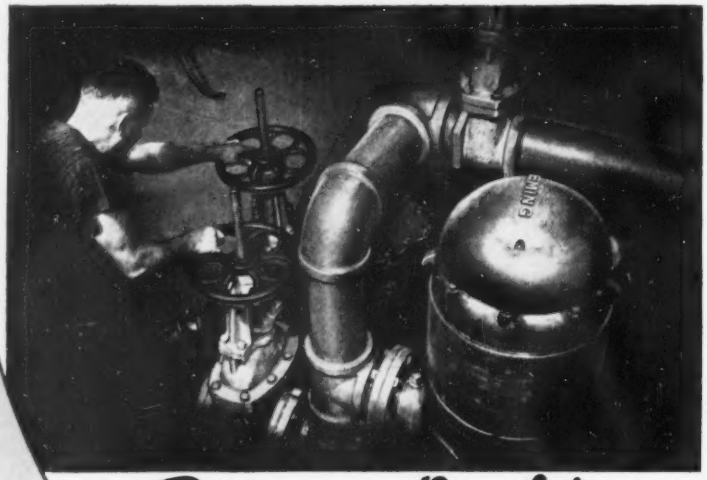

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"Fine Paper at its Best" is the famous slogan of the Rising Paper Company, Housatonic, Massachusetts. The first "must" in the manufacture of Rising Papers is pure, crystal clear water.

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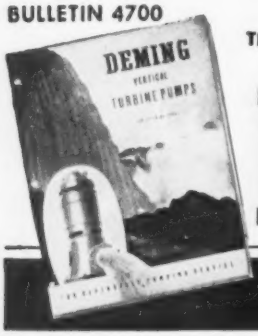
Investigate the advantages of Deming Vertical Turbine Pumps. Write for Bulletin 4700.

BULLETIN 4700



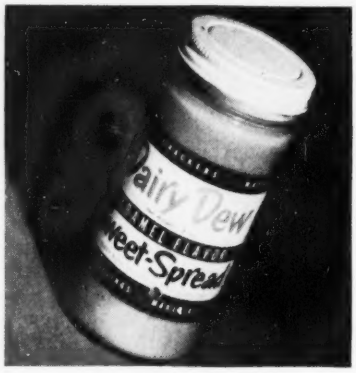
THE DEMING COMPANY • 556 Broadway, Salem, Ohio

Deming PUMPS

without spoiling package or product.

Manufacturers and suppliers of these liquid tight containers include: Scalright Co., Inc., Fulton, N. Y.; Continental Can Co., Inc., Newark; Sutherland Paper Co., Kalamazoo, Mich.; Champion Container Co., Philadelphia; Fonda Container Co., Inc., St. Albans, Vt.; and Miro Container Co., Brooklyn.

For Package Data Use Reader Service p. 213



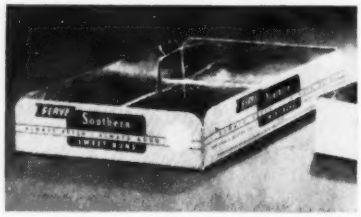
New Dairy Product

Having the consistency and appearance of peanut butter, a new dairy spread is being marketed by G. B. Products, Inc., Utica, N. Y.

Product contains whole milk, nonfat milk solids, water, sugar, emulsifiers, salt, artificial flavoring and certified color. At present this spread is available in two flavors—caramel and chocolate.

It is processed and packed in 8-oz. glass jars with metal closures.

As a spread it can be used on bread, rolls, and crackers. It is also recommended for use in pies, puddings, custards, as an icing on baked goods, and as a topping for ice cream and waffles.



"Bake-in" Foil Trays

A foil laminated tray is now being offered to bakers by Marathon Corp., Menasha, Wis. These trays will enable bakers to market their raw dough products or partly cooked items, such as "Brown 'n Serve" baked goods in a container that can be placed directly into the oven by the housewife.

Because foil is laminated to paper-

board it tends to absorb some of the heat, eliminating temperature control problems. Results obtained thus far indicate that this type tray may become useful to bakers in their own operations. Tests have shown that they work very well in bakers ovens for all low temperature products.

These trays can be purchased either printed or plain.

For Package Data Use Reader Service p. 213

Oysters—"Any Day"

A canned, condensed oyster stew has recently been put into national distribution by Hilton Seafoods Co., Seattle. No need to wait for the "R" months to enjoy this succulent dish. Now it can be stored on the shelf and used at any time.

Fresh homogenized milk and sliced oysters, selected and processed at the peak of their season, are prepared with the addition of butter, milk, and seasoning. A new secret process which makes it possible to add fresh milk and butter during canning was developed so that curdling would not result.

These oysters are being marketed in 10½-oz. cans for the retail trade. For restaurants and institutions an 8-oz. can in a more concentrated form is being offered which allows for the addition of fresh milk at the time of preparation. Also available is a No. 10 can, containing 12 servings, which gives approximately 3 oz. of sliced oysters for each serving.

Flexible Plastic Lids

Buckeye Molding Co., Miamisburg, Ohio, is marketing a line of re-usable polyethylene plastic lids called, "Flexcel". Available in various sizes, with or without embossed lettering, they offer a wide range of glass packing possibilities.

For Package Data Use Reader Service p. 213

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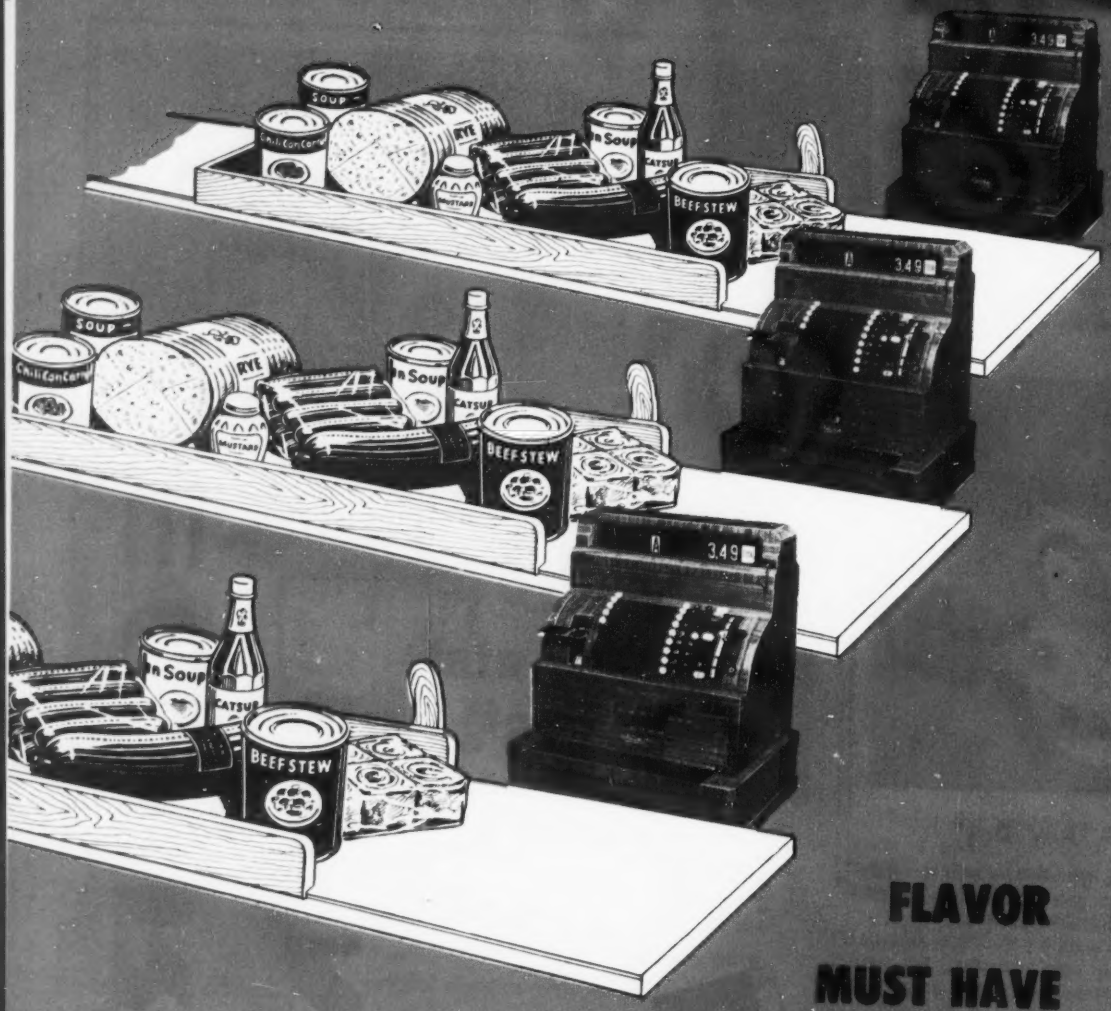

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For full flavor rye bread, rolls, salt sticks and rye rusk, use new **RY-ZING!** You will achieve the maximum in rye taste, aroma, texture and color with only 1% of **RY-ZING!** to 100 pounds of flour. Samples upon request.

In any product that sells—*and resells*—on flavor, only natural spices will do.

Their full strength, carefully guarded by nature's unique and unmatched fibrous cell structure, will stay with your products until eaten. In that taste satisfaction lies your chance for the repeat sales that spell the difference between profit and loss.

With meticulous care, KNICKERBOCKER safeguards this finer, stronger, longer-lasting flavor. Over 110 years of experience are applied to the careful selection, grading and processing of KNICKERBOCKER spices to bring you the best—and you can afford nothing less if you want more sales. Order KNICKERBOCKER *natural* spices today.

Naturally Better Spices = Better Baked and Canned Goods = Better Sales

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Since 1842 America's Leading Importers of Fine Spices

601 West 26th Street New York 1, N. Y.

Spices

Preventive Maintenance

—Continued from page 84

plete all the steps of the training techniques—preparation, explanation, application, and examination or follow-through.

Value of Meetings

In our plants, the maintenance department has found it extremely valuable to have a weekly conference. At these get-togethers, held on Thursday afternoons, work performed the previous week is reviewed and the maintenance schedule for the week end and the following week is planned.

As the work orders are laid out for the weekend, the necessary materials and equipment required for the jobs are also discussed to make sure that no task need be stopped before completion because the equipment and materials are not at hand.

These meetings have been especially beneficial in plants where the production department supervisors are invited to attend. The plant engineer checks the status of work orders submitted by each of the production departments, and the conference arrangement is such that everyone gets an opportunity to contribute to the maintenance effort.

In this way, the preventive maintenance program is fully understood by the production supervisors. Frequently, the condition of the equipment in a specific department is discussed in order to obtain the cooperation of the department head in scheduling units for overhaul.

We are pleased to note that the weekly maintenance meetings have made for greater unity between production and maintenance, with each coming to know the other's problems.

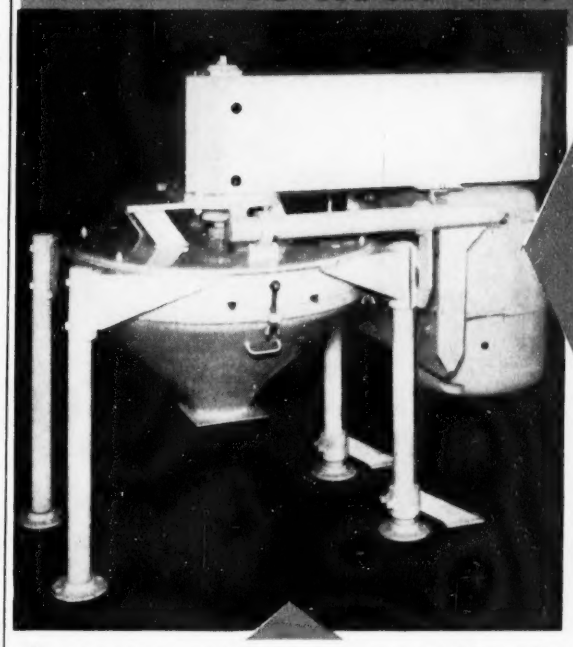
Protects Investment

The construction of new plants, modernization of existing ones, and increased mechanization have cost our company millions of dollars during the past five years. To protect this considerable investment and reduce the maintenance costs, the positive preventive maintenance program detailed here was installed.

We have purchased the best machine tool equipment available . . . outfitted modern maintenance shops . . . hired and trained maintenance personnel . . . and developed a capable maintenance organization. However, the time values of these assets would not be derived were it not for the fact that we have capped them with a good, sound PM program.

End *(Resume reading on page 85)*

500 CWT PER HOUR!!!
it's a cinch with the
NEW "BIG INCH"....



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for 150 to 500 cwt per hour

the STANDARD "ENTOLETER" unit for
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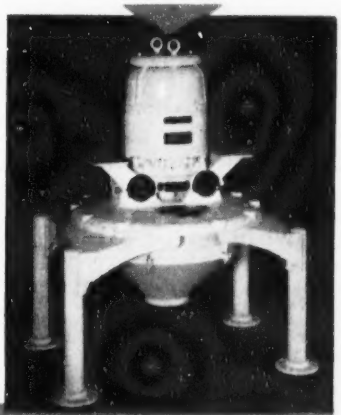
You guarantee the quality of your food products . . . let "ENTOLETER" Infestation Control help to insure the complete cleanliness of ingredients and finished product.

. . . the trademark "ENTOLETER" is your guarantee of complete satisfaction. For information concerning our products, write to "ENTOLETER" DIVISION, The Safety Car Heating and Lighting Company, Inc., P.O. Box 904, New Haven 4, Conn.



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CENTRIFUGAL MACHINES

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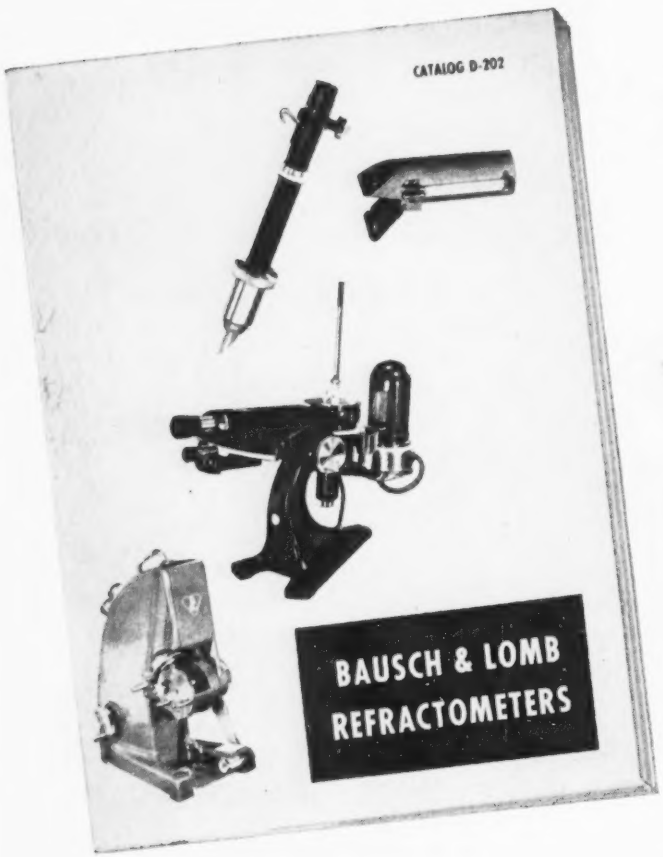
Here's the Answer to . . .



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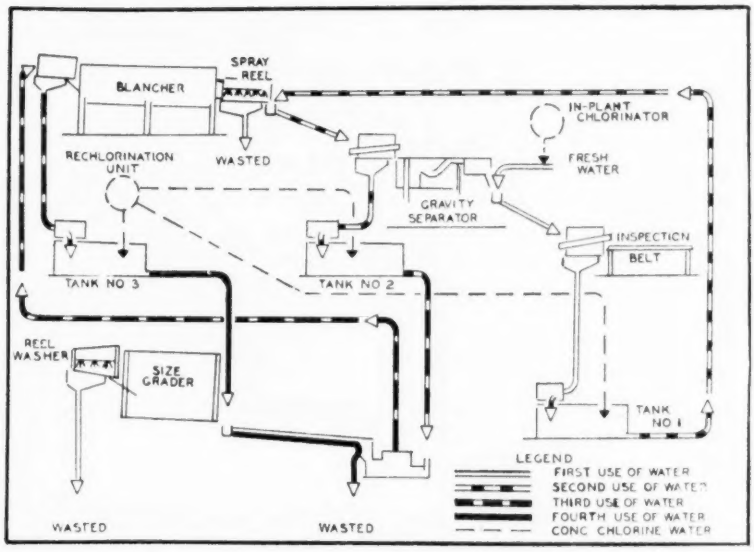

Re-Use Halves Cannery Water Consumption

By employment of counterflow principle, it has been found possible to use the same water for 4 fluming operations in a pea cannery and cut consumption approximately 50 percent. System does not deteriorate product quality nor influence can spoilage losses.

Sequence in use of flume water is directly opposed to progress of vegetables along preparation line (see diagram above). Fresh water enters flume for carrying peas from gravity separator to inspection belts.

This water is collected and used for 2nd time to flume peas from blanchers to gravity separators. All collection tanks are equipped with automatic valves to introduce fresh, highly chlorinated water to make up for losses.

Third use of water is pumping peas to blanchers. Fluming product from size grader to these pumps comprises fourth use. Here, water is drained through a grid and wasted or diverted to flumes for removal of wastes.

To control bacterial population, water must be chlorinated at several points in the system. An in-plant chlorinating unit (see diagram) maintains 5 ppm. residual Cl in fresh water entering system. This is quickly depleted and must be built up again by a 2nd chlorinator that delivers strong chlorinated water to the 3 collecting tanks. Temperature of re-use water should be maintained below 70 F.

Peas should be discharged from blanchers into reels where they are cooled and washed by sprays of fresh, chlorinated water which is discarded.

Digest from *"Re-use of Water in Canning,"* by W. A. Mercer and G. K. York, Western Branch Lab., NCA. Presented at NCA Convention, Chicago, Feb. 23, 1953.

Effect of Chlorine In Water On Corrosion of Metals

Brass and mild steel do not corrode severely in chlorinated water (0.08-0.4 ppm. Cl). In soft water effect of Cl on mild steel was negligible, in harder water there was a slight reduction in corrosion rate compared to non-chlorinated water, but depth of penetration increased.

Rates of corrosion of brass were 25 percent or less of those for steel in either chlorinated or unchlorinated water. Chlorination increased rates of corrosion slightly for soft water, more for hard. Softening water reduced corrosion rate. High rates of flow increase corrosion, and at 50 fpm. corrosion of brass was appreciably greater than for lower rate of 1.2 fpm.

Digest from "The Corrosion of Mild Steel and Brass in Chlorinated Water," by F. Wormwell and T. J. Nurse, *Journal of Applied Chemistry*, Vol. 2, 685-92, Dec. 1952.

Automatic Retort Loader

Apparatus has been patented for loading and unloading cans of food and like from processing retorts used singly or in a battery.

Unit comprises vertical shell containing assemblage that can be raised or lowered. Assemblage is made up of a series of superposed, perforated disks rotatable about a central shaft. Each disk is fitted with a divider, or finger, which serves to move incoming cans to center during loading. When direction of rotation is reversed, finger moves cans toward discharge port. Cans are delivered to apparatus by belt and chute, and removed by similar combination.

In loading retort, assemblage is raised until lowermost disk is positioned with delivery belt and chute. When filled, assemblage is lowered to next disk, and so on, until all are loaded. When retort is properly fastened, steam is admitted and disks are rotated to insure uniform cooking of can content. For unloading, uppermost disk is emptied first, and then succeeding lower ones.

Digest from U. S. Patent 2,622,747, issued Dec. 23, 1952, on an application dated March 12, 1948, to F. J. Bott, Ogden, Utah, assigned to Berlin Chapman Co., Berlin, Wis.

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BAKING

Good Volume White Bread From Untreated Flour

A normal loaf of white bread is made from untreated flour by a process in use at Beatties Bakeries, Glasgow, Scotland. Process is based on use of machine with high-speed beaters that incorporate sufficient air in flour batter to bleach it without use of chemicals. It may be used with straight-run, 85 percent extraction flour having a water absorption of 15½ gal. water per 280 lb. sack, or with 81 percent extraction flour.

Into the mixing bowl of machine is put 140 lb. flour, 5 lb. salt, 15 gal. water. Temperature of ingredients should be 65-70 F. Amount of air incorporated is indicated by resistance of batter to action of beaters that operate at 350 rpm. When it reaches a maximum (3-8 min.) as shown by current required to operate the 60 hp. motor, beaters are stopped and 140 lb. flour plus other ingredients including yeast is added. Beaters are replaced by a slow-speed dough arm for the final mixing. Dough is then fermented and handled in the usual bread-making manner.

Digest from "Bread from Untreated Flour," *Food Processing, Packaging, Marketing,* (Published at 33 Tothill St., London.) 77-78, Feb. 1953.

CEREAL PRODUCTS

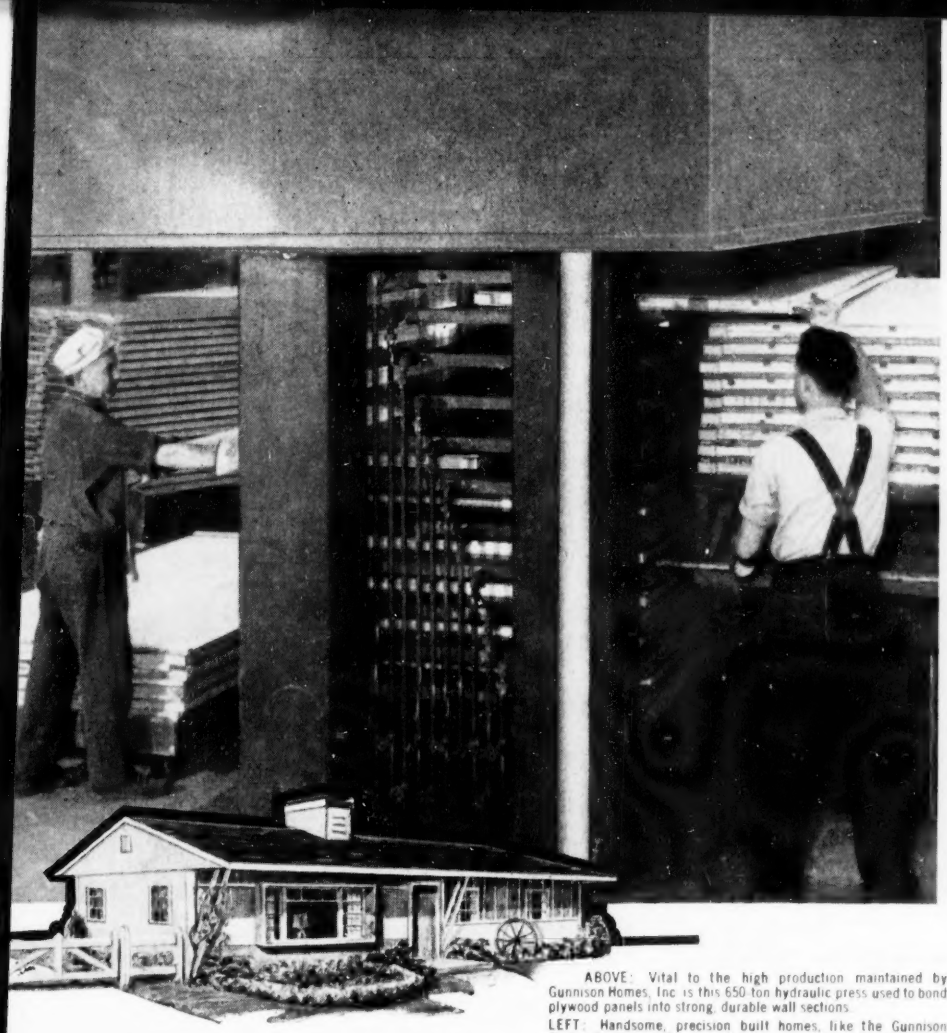
Heavier Load, Slower Drying Reduces Malt Kilning Cost

Kilns designed to dry malt in two 12-hr. periods, one on upper screen and the second on lower, can be adapted to two 24-hr. periods with a definite saving in labor and fuel, provided air distributing capacity and heating powers are sufficient.

This was demonstrated in a kiln which had been used on green malt from a combined floor and CO_2 rest system. Charge was doubled on upper screen when depth of malt was increased to 11 in. Green malt with 42.6 percent moisture and loading of 17½ lb./sq. ft. received air at 104 F.—slowly increased to 122 F. over 16 hr. By this time moisture was reduced to 15.5-20 percent, and by 24 hr. to 8.5-12 percent. Six hours at kilning off temperature on the lower screen gave a product of 3.4 percent compared to normal 2 x 12 hr. malt of 4 percent moisture.

Longer dried malt had only slightly less diastatic power and yielded beer equal or superior to normal malt in color, flavor and foaming power. Sav-

For more information, use coupon on page 213.



ABOVE: Vital to the high production maintained by Gunnison Homes, Inc. is this 650-ton hydraulic press used to bond plywood panels into strong, durable wall sections.

LEFT: Handsome, precision built homes, like the Gunnison Coronado pictured here, are built in a matter of hours.

Answers a pressing need for Gunnison Homes, Inc. . . .

● Gunnison Homes, Inc., situated in New Albany, Indiana, is one of the leaders in the field of manufactured homes. Key to continuous production of precision built homes at the New Albany plant is the 650-ton hydraulic press, shown above, which was installed in 1947. This press processes ten plywood panels every cycle by the combination of heat and pressure . . . a tough job and one requiring reliable hydraulic performance to maintain production schedules.

STANOIL Industrial Oil was installed in the press when it was put into operation six years ago. STANOIL has stood the test of severe operation . . . with no evidence of oil deterioration being found during a recent inspection of the hydraulic system. Operation has been efficient. Minimum make-up oil has been needed to maintain the oil capacity of 450 gallons.

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Industrial Oil

Find how STANOIL can benefit you by discussing this multi-purpose oil with a Standard lubrication specialist. You can contact him by phoning your local Standard Oil office. Or, write: Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

What's YOUR problem?

Ralph E. Murnahan, of Standard Oil's Evansville office, is the lubrication specialist who keeps in constant contact with Gunnison Homes to make certain that there is no interruption of operation due to lubrication difficulties.

He is one of many lubrication specialists who make their headquarters in Standard's offices throughout the Midwest. These men have been specially trained in Standard's Lubrication Engineering Schools and, in addition, have a wealth of on-the-job experience.

To obtain the service of the lubrication specialist in your area, you need only call your local Standard Oil office. The lubrication specialist will discuss your lubrication problems with you . . . at no obligation to you, of course. He has a complete line of petroleum products to offer you, including:

SUPERLA Greases—Available in a wide range of consistency grades and in both lime-soap and soda-soap types. SUPERLA Greases cover a wide range of operations. These efficient products are comparable in quality with the highest type of special greases.

STANOLITH Greases—Because these unique lithium soap products possess the heat resistant properties of soda-soap greases and the water resistant properties of lime-soap greases, they offer a solution to lubrication problems caused by the presence of both heat and water.

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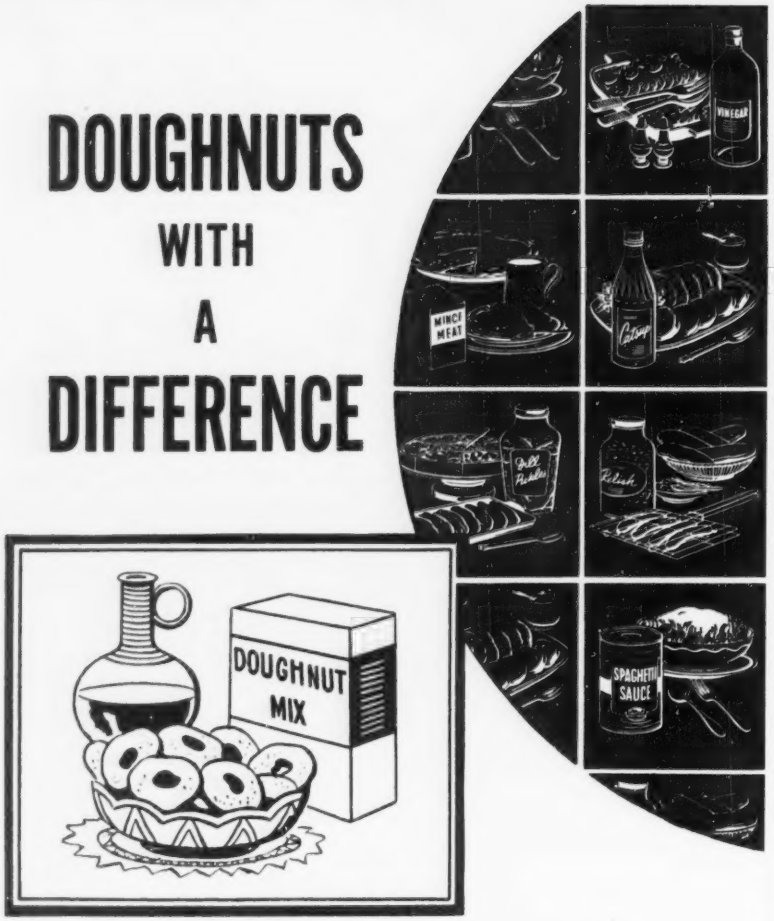

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ing in labor was considerable through having to empty and charge kilns only once in 24 hr., and fuel saving resulting from cooling kilns only once a day amounted to about 15 percent.

Digest from "Two-Times-Twelve- or Two-Times-Twentyfour-Hours Kiln Time," by A. Friedrich, *Schweizer Brauerei-Rundschau,* Vol. 63, 207-10, Dec. 1952.

New Macaroni Process

Preparation of a cooked tubular alimentary paste product by lamination instead of extrusion is the object of process for which a patent has been granted.

A paste dough, containing 27-33 percent water, is formed into elongated sheets by means of press-rolls. At least two sheets are superimposed, passed through press-rolls to laminate and express air, and cut into elongated strips which are cut transversely into units of desired length. Shearing action of cutters pinches marginal portions of respective laminae causing them to cohere.

Units are cooked in edible oil at 320-465 F. for 10-60 sec. During cooking, moisture in the dough expands causing laminae to separate and form alimentary paste tubes.

Digest from U. S. Patent 2,615,809, issued Oct. 28, 1952, on an application dated Dec. 7, 1949, to P. J. Jean, Montreal, assigned to Cereal Food Products Co., Quebec City, Canada.

BEVERAGES

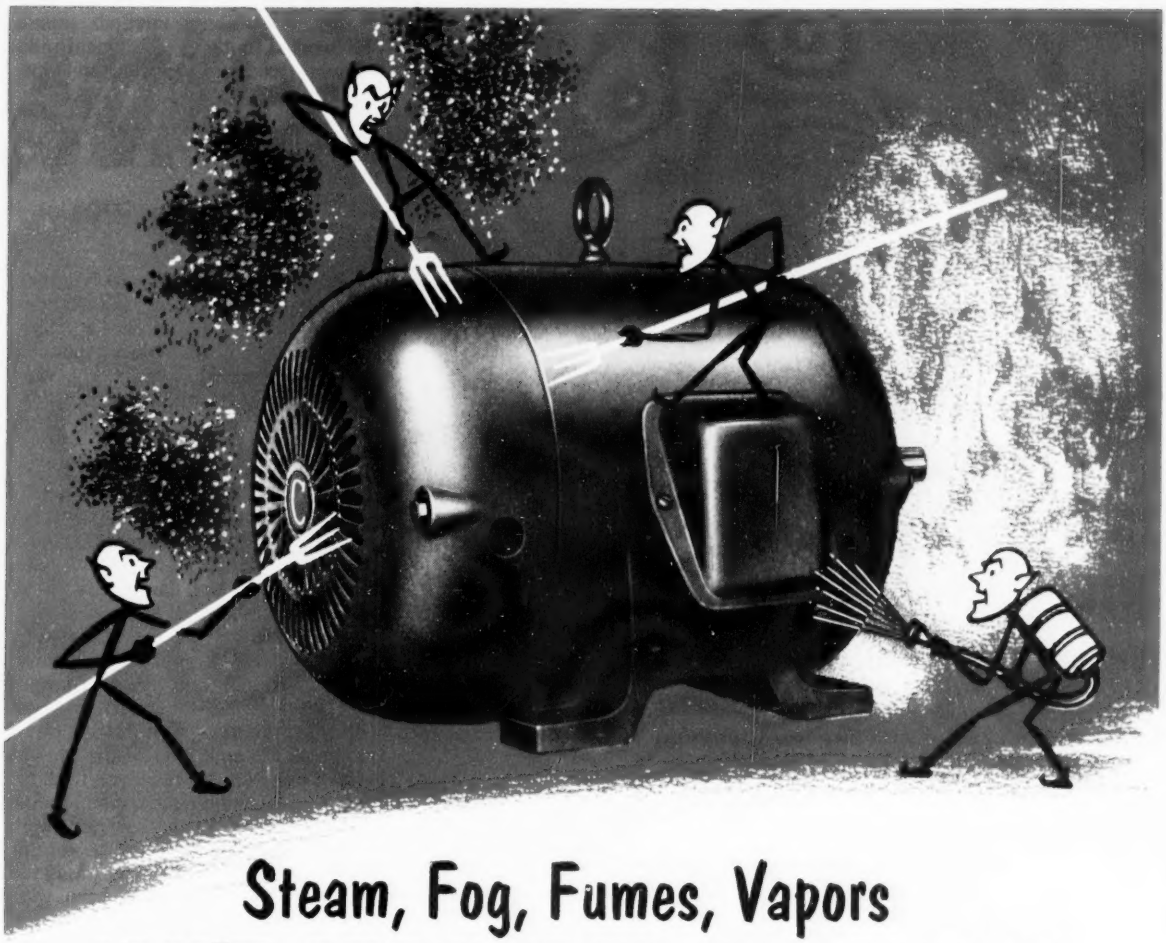
High Frequency Treatment Increases Hop Extraction

Ultrasonic vibrations applied to wort in brew kettle after hops have been added, increase extraction of bitter substances, and save up to 40 percent of normal hop additions.

In a series of three experimental brews, ultra-sound (100,000 cycles per sec.) supplied by an Ultrakust quartz generator, was applied to near boiling wort in kettle for 1½ hr. Input energy as sound was 300w.

Hop reductions of 40 percent, and 30 percent were tried, as well as a 60 percent normal rate with part of hops used as extract. Fermented beers did not differ appreciably in chemical analyses by standard methods, but ultra-sound treated ones had higher bitter substance contents than their hop usage would normally supply, indicating improved extraction. Stability and foam qualities were not affected, and tastes were normal except for a better hop bouquet in the untreated beer.

Beer with 70 percent normal hops was close to the untreated in quality and was actually preferred at some tastings. When using ultra-sound



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The inner frame of your Century TEFC Motor completely seals all the vital working parts against air-borne hazards. An effective stream of air blown between the inner and outer frames, keeps the motor temperature within safe limits at rated load.

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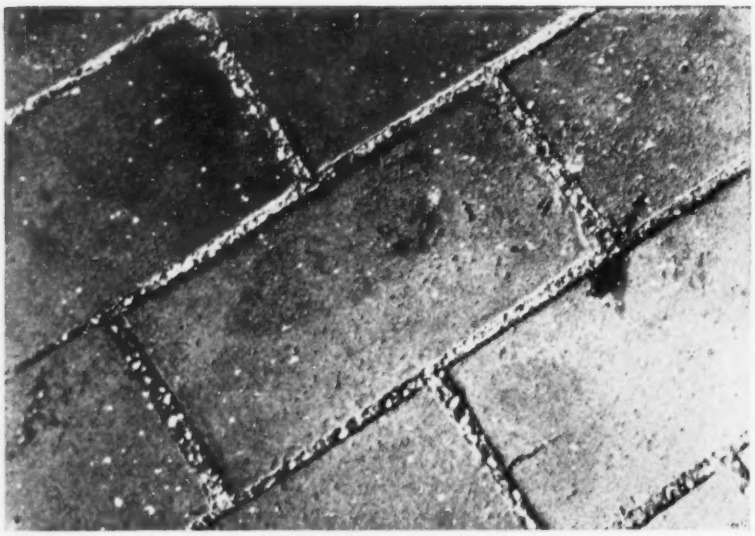

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STOP pouring money into questionable floor constructions. You no longer have to put up with these costly eye-sores which are not resistant to the common corrosives involved.

The new ATLAS FURNANE® FOOD PLANT FLOOR combines architectural beauty with a construction that goes in to stay . . . and to serve for years without constant maintenance. Materials alone could not do this . . . neither could new construction or installation methods. Only the combined development of all three gives you the degree of assurance you get with an ATLAS FURNANE FLOOR.

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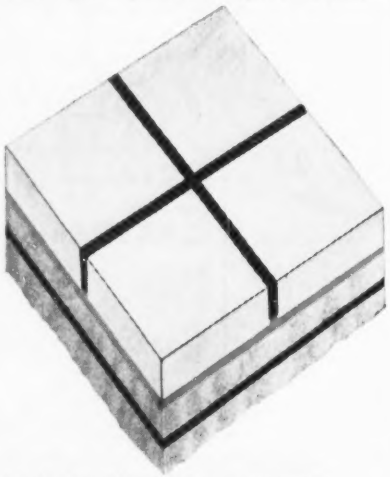

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Houston 1, Texas

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FOOD PLANT FLOORS
...the realistic solution to food floor protection.

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treatment optimum methods should be worked out for equipment and brewing processes prevailing in brewery.

Digest from "The Use of Ultra-Sound in the Brewery," by A. Schmal, *Schweizer Brauerei-Rundschau*, Vol. 64, 1-4, Jan. 1953.

Malt Modification

Biting kernels of malt to test their mellowness is a simple and accurate way of testing for mealiness or modification. The Brabender hardness tester, is designed to utilize the same principle by measuring resistance of a sample of malt to grinding in an accurate mill.

An even simpler method is adaptable to Seck laboratory mills used by most malt-testing laboratories. A watt-hour meter, capable of readings to 0.001 w.-hr. is inserted in the motor circuit, and power required to grind a 70 g. sample to standard fineness is measured in w.-sec. Grinding is timed by stop-watch and power needed to run mill when empty is deducted. By dividing the difference by time, the number of watts required to grind the sample is calculated. The "watt-number" of the malt thus obtained, is a measure of its modification, and is not appreciably affected by its moisture or husk content, as long as these are in normal ranges. Malts of every good modification have watt-numbers of 130 or less; good malts, 131-150; poor malts, 171-190.

Digest from "Increasing Malt Investigations in the Plant Laboratory," by G. Held, *Brauwelt*, 708-13, Aug. 7, 1952.

FISH & MEAT

Freezing Fish At Sea

A solution containing equal parts by weight of $CaCl_2$ and glucose overcomes many of the previous limitations on immersion-freezing of fish in the round.

In experiments by Boston laboratory, U. S. Fish & Wildlife Service, important New England species of groundfish were immersion-frozen in baths of sugars and inorganic salts. A solution containing 25 percent each $CaCl_2$ and glucose was found most satisfactory. Its freezing point (−24 F.) provides lower temperature range than Nacl brines; it has low viscosity, is inexpensive, and affords ample excesses of dissolved products to balance dilution produced when large quantities of fish are placed in the bath.

Taste panels, when served portions of unseasoned, steamed fish, previously frozen in the glucose-calcium bath,

NOW- a NEW easy-opening leak-tight SANITARY PLUG VALVE

. . . another outstanding TRI-CLOVER development

• Here are the component parts of the new Tri-Clover Auto-Lift Plug Valve. As shown, this new valve is available in standard Acme thread construction, as well as with flanged ends to be used with the new fast-action TRI-CLAMP sanitary fittings—for "take-down" lines or for "permanent" cleaned-in-place lines.

HERE'S the fastest acting, easiest opening, leak-tight sanitary plug valve ever developed . . . the new TRI-CLOVER *Auto-Lift Plug Valve!*

Secret of the smooth, easy action is the exclusive "cam-action" of the handle and locking pin assembly, which provides a positive lifting and "cracking" action on the plug, by working against the spring steel plate below the valve body. In addition, constant holding pressure of the lower lock nut prevents leakage.

These new Tri-Clover Sanitary Valves are available in 2-way and 3-way types, in sizes from 1" through 4" O.D. Representing the very highest quality, they are manufactured of Stainless Steel Type 304. Flash hard chrome plate is applied to outside wearing surfaces of plugs for extra hardness to reduce galling and binding.

Write for further details, or see your nearest Tri-Clover Distributor.

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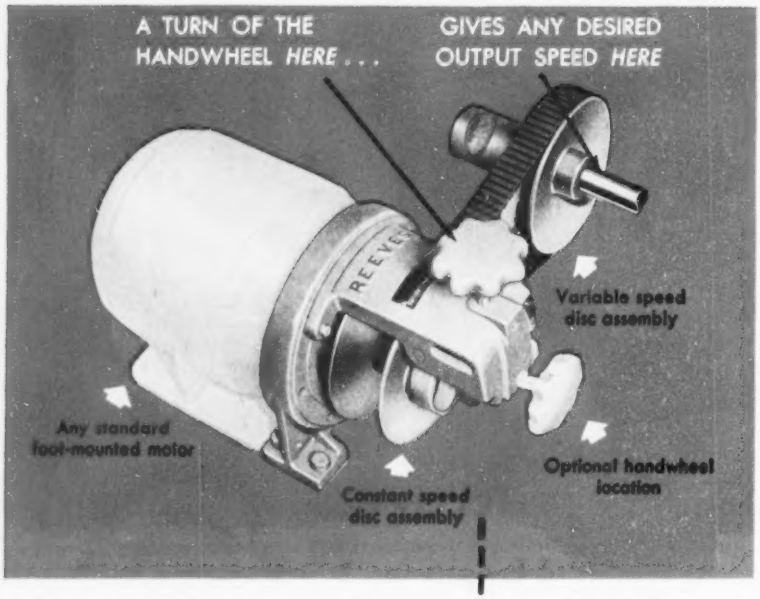
NEW! REEVES
Flexi-Speed Drive

Mounts in any position . . . drives in any direction . . . gives any speed within 8:1 range. *Low Price!*


A TURN OF THE HANDWHEEL HERE . . .
GIVES ANY DESIRED OUTPUT SPEED HERE
Variable speed disc assembly
Any standard foot-mounted motor
Constant speed disc assembly
Optional handwheel location

New REEVES Flexi-Speed Drive is the most versatile variable speed drive on the market today. Drives in any direction. Mounts in any position—above, below or beside the driven machine—practically without limitation. Speed control handwheel and driven shaft may be located anywhere around the motor shaft. Six different length belts offer a wide choice of shaft center distances.

For all these reasons, REEVES Flexi-Speed Drive is the easiest, most practical, and economical way of converting any constant speed motor to an infinitely variable speed drive *with 8:1 speed range*. May be used with any standard ball bearing, foot-mounted motor of ½, ¾ or 1 hp. Identical in working principle to the time-tested REEVES Motodrive, the Flexi-Speed Drive consists of constant speed disc assembly, variable speed disc assembly, double-cog belt and versatile shifting mechanism.

REEVES Flexi-Speed Drive is ideal for driving to standard gear reducers for parallel drive, on worm gear reducer for inexpensive right angle drive. Its versatility assures maximum production with the greatest efficiency and economy in your machines. Write today for complete details. Specify Dept. FE90-V532.

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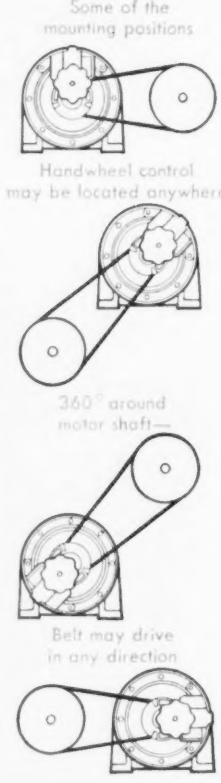

Some of the mounting positions
Handwheel control may be located anywhere
360° around motor shaft—
Belt may drive in any direction

REEVES SPEED CONTROL

were unable to distinguish them from control samples frozen in NaCl brine.

Digest from "A New Liquid Medium For Freezing Round Fish," by John A. Holston, *Commercial Fisheries Review*, 36-40, Dec. 1952, Supplement.

DAIRY

Many Spores Survive Antibiotics in Milk

Subtilin plus mild heat is not an effective method for processing normally produced whole and concentrated milks. The treatment does not control significant spoilage-inducing species at high subtilin levels, and fails to prevent growth of *Cl. botulinum*.

Normal and concentrated milks, with and without added resistant bacterial spores, were processed with subtilin (10-100 ppm.) and heat at 212 F. for 10-13 min. Several cultures at 20-40 ppm. subtilin induced spoilage over a 5-mo. storage period at 86 F.

Subtilin (100 ppm.) plus heating did not prevent spoilage from *Cl. botulinum* when spore innoculation was high. With fewer spores, samples did not spoil with 40 ppm. subtilin. However, viable spores were found after 5-6 mo. storage. Samples receiving minimal inoculations and 100 ppm. subtilin were practically all spoiled after 15-mo.

Digest from "The Preserving Action of Subtilin and Mild Heat in Normal and Concentrated Milk," by F. R. Evans and H. R. Curran, *Journal of Dairy Science*, 1101-6, Dec. 1952.

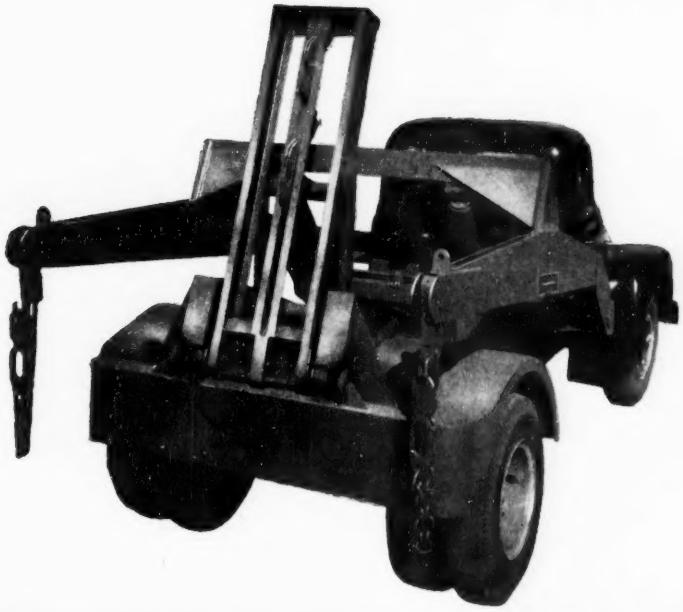
FATS & OILS

Filtration Extraction Uses Less Solvent

Solvent extraction of oil from cottonseed, soybeans or rice bran has been carried out successfully on a horizontal vacuum filter.

Flaked, cooked oil-bearing seeds are slurried with hexane or miscella in simple continuous mixing conveyor discharging continuously onto horizontal filter revolving at 1-3 rpm. Filter is clothed with plain 24 x 110 mesh Dutch wire screen. As it revolves, miscella, containing 22-26 percent lipides, is drained from marc in first section and oil solution is sent to the miscella filters, then to oil recovery system.

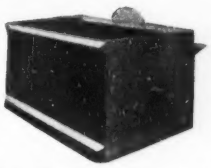
In succeeding sections marc is washed twice with miscella of decreasing lipide strength and finally with fresh solvent from recovery system. Marc forms friable layer readily removed from filter by 70 rpm. spiral discharge scroll. Meal not removed



WHY USE 3 TO 5 TRUCKS... WHEN ONLY ONE WILL DO?

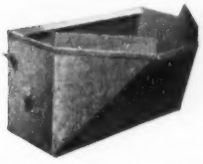
In many plants a Dempster-Dumpster, like the one above, operated by only one man, the driver, has replaced 3 to 5 conventional trucks and crews. The reason for this is that one truck-mounted Dempster-Dumpster serves scores of Dempster-Dumpster Detachable Containers up to four times the capacity of the average dump truck body. These containers are built in a wide variety of designs best suited to the type of materials handled—be they bulky, light or heavy . . . solids or liquids . . . trash or rubbish. Containers are conveniently located at accumulation points inside and outside buildings. To illustrate the flexibility of the Dempster-Dumpster System in handling all types of materials in your plant, we show, at right, a few of the dozens of Dempster-Dumpster Containers built to meet every bulk materials handling need. And remember, one truck-mounted Dempster-Dumpster handles all containers, regardless of capacity or design.

The Dempster-Dumpster System eliminates standing idle time of crews and trucks . . . eliminates re-handling of materials . . . increases efficiency, sanitation and good housekeeping . . . cuts cost of truck equipment and operation tremendously. Without question, it's the most efficient and lowest cost method of bulk materials handling by truck ever devised! The chances are this system will save you thousands of dollars annually. This equipment manufactured and sold exclusively by Dempster Brothers, Inc.

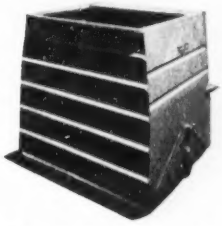


Drop Bottom Container built up to 10 cu. yd. capacity to handle heavy materials.

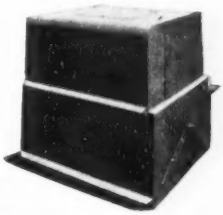
Tank Type Container meeting A.S.M.E. specifications. Capacities up to 1,200 gallons.



Tilt Type with Converged Lip for handling fine aggregate, wet or fluid materials.



Drop Bottom Pressed Steel Type for lighter service.



Universal Type built up to 12 cu. yd. capacity with top and end doors.

Five cu. yd. container with swivel casters for handling waste blast sand.

WHEN A CONTAINER IS FULL, the Dempster-Dumpster picks it up, hauls to destination and dumps the materials or sets load down intact. These three simple operations, shown above, are hydraulically controlled by driver in truck cab.

DEMPSTER BROTHERS, 743 Shea Bldg., Knoxville 17, Tenn.

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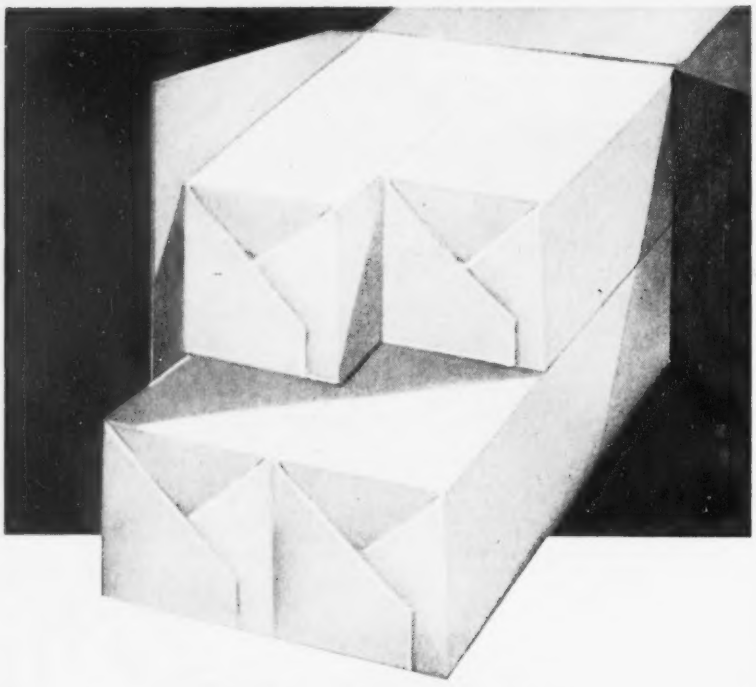

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butter's delicate flavor

30-37 TW is the latest type of Patapar Vegetable Parchment specially designed to give butter the utmost protection at low cost. It has high wet-strength. It resists grease and moisture vapor transmission. It has a new opaqueness. It is non-toxic. It has no odor – nothing that will impart "off" flavor.

Butter wrapped in Patapar 30-37 TW can be given additional protection with a printed paraffined overwrap or carton.

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30-37 TW is just one of the various types of Patapar. In all we have developed 179 different types. Some are used for packaging bacon, lard, giblets, ice cream, cheese, poultry, hams, and celery. In other fields Patapar is used for dialyzing membranes, separators in tiny mercury batteries, drafting paper and many other purposes.

Patapar is furnished in sheets or rolls, plain or beautifully printed with colorful designs. Tell us the use you have in mind and we'll send more information.

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by scroll is lifted from the screen by flow back of nitrogen and mixed with fresh feed slurry.

Discharged meal has 22-28 percent solvent, 0.6-1.5 percent lipides. Desolventized meal has 0.66-1.49 percent lipides, 4.8-6.0 percent moisture. Preliminary cost estimates indicate that method for cottonseed should cost less than conventional solvent extraction, based on 100 tons seed per day, and low solvent requirements should reduce operating costs.

Digest from "Filtration Extraction of Cottonseed," by E. L. D'Aquin, H. L. E. Vix, J. J. Spadaro, A. V. Graci, Jr., P. H. Eaves, C. G. Reuther, Jr., L. J. Molaison, E. J. McCourtney, A. J. Crovietto, E. A. Gastrock, and N. B. Knoepfler, *Industrial & Engineering Chemistry*, 45, 247-54, 1953.

FRUITS & VEGETABLES

Saving Fruit Flavors

Aromas ordinarily lost in making fruit preserves can be captured and returned to the product to enhance its flavor, or used to flavor other fruit products. To do this merely involves changing usual condenser arrangement on vacuum pans in which preserves are boiled.

Substitution of a surface condenser for the usual water-jet or barometric type, and use of low-temperature water for condenser or after-cooler enables collection of flavor-bearing condensate. Then condensate is passed through an essence recovery unit based on principles developed at ERRL for recovery and concentration of essences.

Reincorporation of essence into preserves improves their flavor and aroma. However, tests show that this improved flavor is lost in a few months when products are stored at room temperatures.

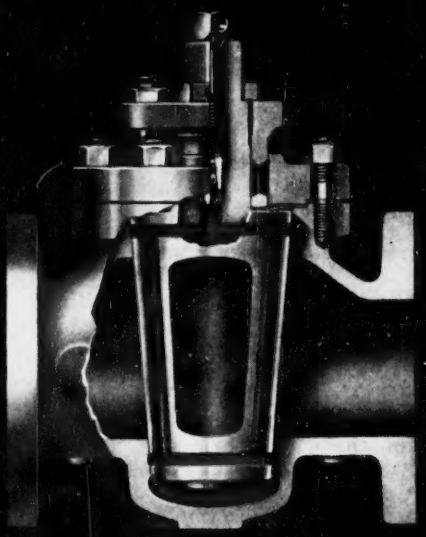
Digest from *"New USDA Process Captures Fruit Flavors Lost in Making Preserves,"* Agricultural Research Administration, USDA, Washington 25.

MISCELLANEOUS

Properties of Refrigerants

Compressor types largely determine selection of a refrigerant. For reciprocating units it must have a relatively low boiling point at atmospheric pressure—usually less than 30 F. Best refrigerant for centrifugal compressors is one of high boiling temperature—30-90 F.—and for a rotary machine, it should boil between 0 and 80 F.

Of common refrigerants, ammonia is most economical where its toxic properties are not detrimental. Operating cost per ton is lower, and its vapor density permits high velocities



LUBRICATED PLUG

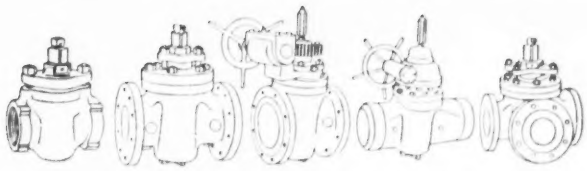
COMPLETE LINES OF LUBRICATED PLUG VALVES

Because of the wide range of services to which Lubricated Plug Valves can be adapted, they may be classed as "all-purpose" valves. Walworth manufactures complete lines of Lubricated Plug Valves in a variety of types and materials for working pressures up to 5,000 psi and for vacuum services. Sizes range from ½ to 30 inches. Write for descriptive literature.

Walworth also manufactures complete lines of gate, globe, angle, and check valves made of steel, bronze, iron, and special alloys.

Walworth valves, pipe fittings, and pipe wrenches total approximately 50,000 items and are sold through distributors all over the world.

Walworth engineers will be glad to help you with your problems. Call your local Walworth distributor, nearest Walworth sales office, or write to our General Offices, 60 East 42nd Street, New York 17, New York.



Illustrated in section is a Walworth No. 1700F Regular Gland Type, Wrench Operated, Steeliron, Lubricated Plug Valve. This particular line of valves has a working pressure rating of 200 psi at 150F or 125 psi at 450F. Sizes range from ½ to 8 inches. Other Walworth Lubricated Plug Valves include Single Gland and Ball Bearing types. They are available for a variety of working pressures.

For best results use Walworth Lubricants and Walworth High Pressure Lubricant Guns.

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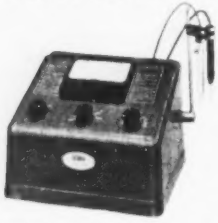
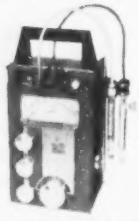
AUTOMATIC: Beckman Model R pH Indicator operates from 115 v AC circuits to provide completely automatic pH indication . . . operates standard recorders and controllers for fully automatic process control.



GENERAL-PURPOSE: Beckman Model H-2 pH Meter operates directly from 115 v AC current—is widely used for manual pH control in small plants and as an auxiliary instrument on completely automatic pH installations.



COMPLETELY PORTABLE: Beckman Model N pH Meter operates from self-contained power supply—is unusually compact and completely portable. Can be used anywhere—plant, field or laboratory—without dependence on AC power circuits.

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HAVE YOU INVESTIGATED what others—*possibly your own competitors*—are doing to cut costs, improve flavor, quality and uniformity in food processing with the aid of Beckman pH Control? Here are a few of many typical examples of the advantages being gained with Beckman pH equipment . . .

- **DAIRY PRODUCTS:** Better quality and flavor in the various milk processing and cheese making operations.
- **BAKING:** Better quality and uniformity—fewer rejects—in the baking of crackers, bread and similar products.
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— 4,000-8,000 r.p.m. — without streamlining valve ports and manifolds. Ammonia has high chemical stability, and does not corrode steel and iron piping. However, foods contaminated with it are rendered extremely unpalatable.

Of Freon family, F-11, F-12, and F-21 are most commonly used—F-11 in centrifugal, F-12 in reciprocating, F-21 in rotary compressors. All have favorable density and displacement characteristics. They require neoprene or chloroprene gaskets, and much larger piping than ammonia. Their toxicity is least of all refrigerants.

Methyl chloride is suitable only for reciprocating compressors. Power requirements compare favorably with other refrigerants, and it has been used in systems up to 10 tons capacity. In absence of moisture it is noncorrosive to most metals, but attacks neoprene compositons. Therefore, pressed fiber or metallic gaskets should be used. Pipe sizes and orifices are smaller than for Freon, but larger than for ammonia.

Use of sulfur dioxide has been limited to small domestic units. Its toxicity is relatively low, and technical performance counts high in its favor. SO_2 is the most stable of all refrigerants, nonflammable, nonexplosive, and will entinguish fire. It has low leakage tendencies, but gives ample warning through characteristic odor when leaks occur.

Digest from "The Operating Engineer Looks at the Common Refrigerants," by E. L. Forbes, *Refrigerating Engineering*, 1182-84, Nov. 1952.

Insect Fragments Counted By New Color Method

Differentiation of bran and germ from insect and larvae fragments in wheat flour in 25 min. is possible by a new test method.

It consists of suspending the flour in 0.6 N NaOH, partially neutralizing with HCl, filtering through wire screen, submerging screen in 0.025 percent Crystal Violet solution for 15 min. and observing fragments by transmitted light.

Insect fragments appear bright orange-red, while bran and germ particles are stained deep violet.

Digest from "A New Color Method for Differentiating Bran and Germ Particles from Insect Fragments in Flour," by R. A. Larkin, M. M. MacMasters and C. E. Rist, *Cereal Chemistry*, 54-58, Jan. 1953.

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153b Can unscramblers
153c Can labeler
153d Can packer
153e Glass unloader
153f Rinser
153g Glass labeler
153h Glass packer
153i Carton, bag collectors
153j Line dividers
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Coupon expires July 10, 1953

Don't forget . . . fill in name and address on other side

April 1953

Quality Control for Pickles

—Continued from page 82

temperature-tested to assure the efficiency of the holding zone.

In addition to its automatic controls, each pasteurizer section is equipped with long-stem dial thermometers located above and below the carrying belt. Every 15 min. these are checked and temperatures noted on the permanent record by the pasteurizer operator. Other data recorded on this form are the boiler steam pressure, the recording thermometer reading, the belt speed tachometer indication, and the cooling water temperatures.

By virtue of this continuous and searching tab of pasteurizer performance, we are able to keep "on top" of any trends in performance by the machine and correct them before damage is done. Also, the hard facts of a complete record permit full analysis of the situation should anything substandard appear in the finished product, even long after processing.

Laboratory Control

Another continuous check on pasteurizer performance can be made by the laboratory technician by sending through test jars containing fresh-unwashed or regular-packed cucumbers and jars inoculated with an abundance of microbiological flora. The purpose here, of course, is to check the bacteria-killing efficiency of the unit.

The above test jars are removed from the pasteurizer at 10 min. intervals as they progress through the high heat stage. Plate cultures are then made and checked for total count, molds, yeast, aciduric, and thermophillic organisms.

In addition, the laboratory technician takes samples of the finished product daily and notes the maintenance of product standards as to sugar, vinegar, salt, vacuum, and head space. Also, every batch of cover brine make-up is tested and recorded by the laboratory to insure product uniformity.

In making these product-quality tests, the normal two to three weeks necessary to secure a state of equilibrium between the pickles and brine is eliminated by using a Waring blender. Thus, a jar is removed from the line after brining and whipped in the blender until its contents are a heavy syrup. This syrup can be filtered to take out solids and tests can be made immediately for sugar, vinegar, and salt.

In closing, we wish to mention that the caser attendants also play a part in our quality control program—for it

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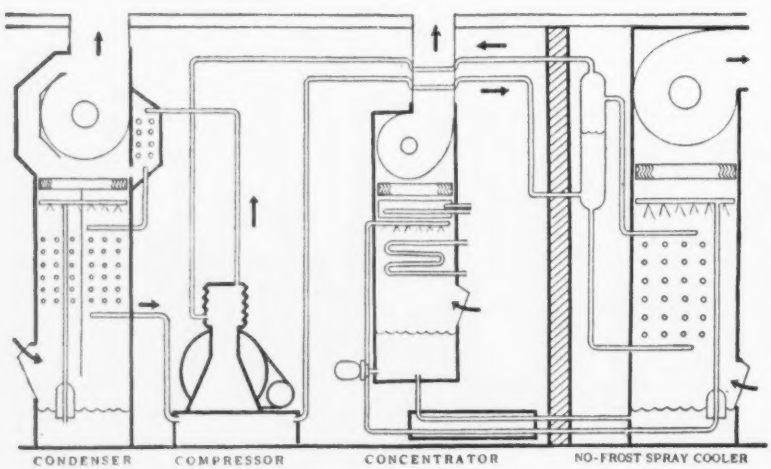

A simple method, easily maintained. Saves a third of your refrigeration cost. Ask for Niagara Bulletins 118 and 119.

is their duty to control the coding and final visual check of the finished product.

It should be stressed that a quality control program is virtually useless without a coding system for containers. All of our carefully kept records would be of no avail if we could not correlate them to a specific finished product.

Coding should be changed at hourly intervals in order to get exact pinpointing of the time when product spoilage might have been caused. We do not have this method of coding now, but hope to establish it in the near future.

End (*Resume reading on page 83*)

Bulk Sugar by Truck

—*Continued from page 73*

four-wheeled trailer are identical. However, the latter is fitted with a single-axle, four-tired dolly and converter gear at the front end to make it a self-supporting vehicle and to connect it to the rear of the semi-trailer ahead.

Down to Figures

The train (tractor, semi-trailer, and four-wheeled trailer) has a payload capacity of 41,560 lb., or a trifle less than 21 tons. This loading is allowable under the California maximum gross allowable weight of 76,800 lb. and empty train weight of 35,240 lb.

The train empty weight is made up of 12,500 lb. for tractor, 9,900 lb. for semi-trailer, and 12,840 lb. for four-wheeled trailer.

California also limits axle loadings to 18,000 lb. each. Since the train has five axles (two on tractor, one on semi-trailer, and two on four-wheeled trailer), the theoretical gross allowable weight would be 90,000 lb. (5x18,000). Since the front tractor axle cannot be fully loaded because of the design of the tractor itself, the practical gross loading is the stated 76,800 lb., this with a tractor front axle loading of 4,800 lb.

If need be, tractor and semi-trailer may be used as a unit without the other trailer. However, this is not so desirable, because the proportionately smaller load is less economical. In this arrangement, payload is reduced to 18,400 lb. or approximately 9 tons.*

Because it does not require as pow-

* Calculated on gross allowable weight of 40,800 lb. made up of 18,000 lb. each for tractor rear axle and semi-trailer axle (36,000 lb.) and 4,800 lb. on tractor front axle. From this 40,800 lb. is subtracted empty tractor and semi-trailer weight of 22,400 lb. (12,500 lb. for the tractor and 9,900 lb. for semi-trailer), giving net allowable payload of 18,400 lb.

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These are just two recent examples of how Flo-Sweet engineering, backed by Flo-Sweet purity and Flo-Sweet dependability, works continuously to save you money while helping you improve the product quality that keeps your established customers and wins new ones. Why not consult Flo-Sweet engineers to see if you are overlooking any possible savings in your sugar handling? There's no obligation, of course.

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erful a tractor to pull only the semi-trailer, it would be possible to use a smaller tractor in this combination. This would increase net payload.

If the smaller tractor weighed only 9,000 lb. (instead of the 12,500 lb. of the train tractor) and its front axle loading could be raised from 4,800 to 7,000 lb., then allowable gross weight would be 43,000 lb., the unladen weight 18,900 lb., and net payload 24,100 lb. or 12 tons. This is about 3 tons more than with the heavier train tractor.

With each trailer body having a cubical capacity of 30,000 lb., ratios of net payloads are as follows: When operated as a train, 0.67 to 1 (41,500 lb. to 60,000 lb.); when operated singly with a smaller tractor, 0.81 to 1 (24,100 lb. to 30,000 lb).

How Get It Out?

With the bulk sugar loaded directly into the trailer bodies from overhead hoppers, next problem was how best to get the sugar out of the bodies at the food processors' plants.

Available were two solutions, based on precedent in unloading other commodities from trailer bodies. These were (1) a power-operated screw conveyor in the bottom of the body, or (2) a mechanical hoist to tilt the entire body to unload.

It was decided to employ a body-tilting hoist (Gar Wood hydraulic type) for canting the body to the angle of 50 deg. necessary to unload freely.

Factors cited by C&H in its choice included cleaner discharge and the ability to unload above ground level. Regarding the latter point, certain health authorities in the delivery area prohibit reception of food materials via hoppers or conveyors at ground level or below. Also, the company felt placement of a conveyor in the body posed problems of accessibility.

As to make of equipment, the trailers are Utilities and the tank bodies, which are made of aluminum, are Gar Woods. These are owned by C&H, whereas the tractors are contracted, as is also the delivery of the loads.

The trailers are painted in C&H colors. The tanks are white. And the trailer running gear, fenders, wheels, and lettering are blue.

At present, the company operates one bulk granulated sugar train, making deliveries exclusively in the State of California.

Radius of delivery is approximately 400 miles, with the majority of drops to processors in the San Francisco Bay area and the Los Angeles Basin territory.

End (*Resume reading on page 74*)

PACKAGING HEAT TRANSFER MATERIALS HANDLING SANITATION MIXING INSTRUMENTATION SEPARATING WASTE DISPOSAL

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And who *wouldn't* await eagerly, and study intensely, the results of so big a project!

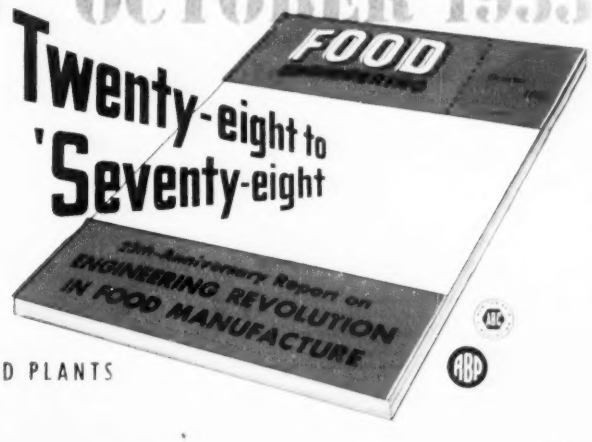
It is easy to see why a cross-section of our readers voted 12-to-1 in favor of this theme for FOOD ENGINEERING's 25th Anniversary Issue.

Now in preparation, that issue will explore the present and future of food packaging, mixing, separation, heat-transfer, materials handling, instrumentation, waste disposal, sanitation, and many other food-plant operations. It will probe the future of processing with x-rays, electronics, antibiotics, ultrasonics, and other new techniques.

All this and more are coming in FOOD ENGINEERING's October issue, as its editors explore the 25 years past . . . and, more important, the 25 years hence – *'Twenty-Eight to 'Seventy-Eight.*

* 'Twenty-eight to 'Seventy-eight

OCTOBER 1953



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Questions & Answers

THIS MONTH'S PROBLEM

Question—We are concerned over shrinkage losses in processing peanuts into peanut butter. Can you offer any suggestions on reducing these shrinkage losses?

Answer to February Problem

The Question Was—We would appreciate your suggestions on the best method of controlling and measuring flow of a heavy consistency, somewhat abrasive food product at a temperature of about 160 deg. F. We have been unable to find a flowmeter that would handle this product at the rate of several thousand pounds per hour, and yet meet our rigid sanitary requirements.

Answer—We are not aware of a strictly sanitary flowmeter suitable for conditions you mentioned. However, the recently announced electro-magnetic type of flow-measuring device may ultimately be developed to the point where it may satisfactorily serve your purpose.

It is our suggestion that you consider using a sanitary designed pump with a variable speed drive. Then make periodical calibration checks on the rate of product flow.

We assume that the composition and temperature of the product remain reasonably constant—also the size and lay-out of the piping. If so, then the flow of product will only vary slightly, depending upon the power-supply voltage, gradual wear of pump parts, possible slippage in the drive, and other factors.

One or two calibrations per day—with constant speed setting—or just one calibration after each speed change may be sufficient.

A very simple check method is catching the flow for a carefully timed test period in a tared container, which is then carefully weighed to give you your product flow.

Since this product has some abrasiveness, it will be necessary to watch for pump wear. You might specify construction parts with maximum resistance to wear, and yet consistent with process and sanitary requirements. The so-called progressing-cavity pump is of sanitary design, and it is suggested as being suitable for your purpose.

You might look into pumps made of stainless steel, Neoprene, or other plastic parts. Such pumps, however, will probably wear much faster than those with metal parts.

Scorches Lard in Rendering

Question—As operators of a moderate sized meat packing plant, we recently installed a dry rendering cooker (dry melter) in our lard department. This unit comprises a horizontal, insulated, steam-jacketed cooking tank with charging and discharging doors, vent and vacuum lines and sampling device. Extending the tank's length is a mechanical agitator that mixes the fats during cooling. First results with this unit—it was a second-hand one—gave us a highly scorched product which, we were told, was due to a cooking temperature that was too high. Our only indication of temperature during the cook comes from a stem thermometer with its bulb located in the vapor space above the fats. We are told that our cook should not go above 240 deg. F. However, we consistently have had scorching when our thermometer read below this figure. How can we achieve better control of the temperature of our cooker?

Answer—Your temperature indicator, which measures the vapor coming off the rendering material is, at best, an inferential gage. It should not be relied upon as a guide to cooking temperature. Theoretically, this will indicate 212 deg. F. as long as moisture is being driven off the product. Then, when material has been rendered sufficiently, the off-coming vapor superheats and drives this instrument upscale. A reading of 225 deg. F. indicates, in general, adequate rendering to about 25 percent moisture content. Termination of heat at this point will preclude scorching.

Actually, this vapor temperature reading has found, in many cases, to be unreliable and attempts have been made to actually measure the product temperature itself during the cook.

Yet, placing the thermal element of an indicating or recording instrument into the product, is a problem. Complete coverage by rotating agitator makes any protruding element in the tank subject to shearing. Also, build-up of heavy material over the sensitive element can effectively alter its accuracy.

We know of one rendering company that has solved this problem with a small thermocouple measuring element enclosed in a stainless-steel well. This is inserted through a drain pipe at the bottom of the cooker and its sensitive tip is thus actively in contact with material being rendered. At the same time, the tip is out of the agitator's path. This operator claims

that he can follow the temperature on its associate recorder to within 1 deg. F., and that he has consistently upgraded his product color by the technique.

Another attempt at true product temperature during rendering involves a rotating thermocouple which is brought into the cooker through its agitator shaft and which turns through the product with the agitator blades. A special commutator at the exposed end of the shaft is used to pick-up the temperature reading and transmit it to an adjacent wall-mounted electronic recorder.

In another approach to cook control, many packers have installed electronic "end-point" controllers which electrically analyze the relationship between fat and protein during the cook and provide a signal or steam shut-off action when proper balance is obtained. Scorching has been prevented in some installations with this unit by an automatic damping of steam to the cooker as the end-point approaches.

Syrup Becomes Turbid

Question—*We manufacture a maple flavored syrup, which consists of syrup (sugar), citric acid, and agar. This mixture is heated to boiling. After sufficient cooling, color and maple flavor are added. Shortly after the syrup is bottled it becomes cloudy. Can you tell us what causes this turbidity and how it can be avoided?*

Answer—The turbidity you refer to is either microbiological, chemical, or physical-chemical in nature. In your specific case, the exact cause must first be determined before a detailed remedy can be offered. If cloudiness takes place soon after color and flavor are added, it would appear that the cause

---

How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers, Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

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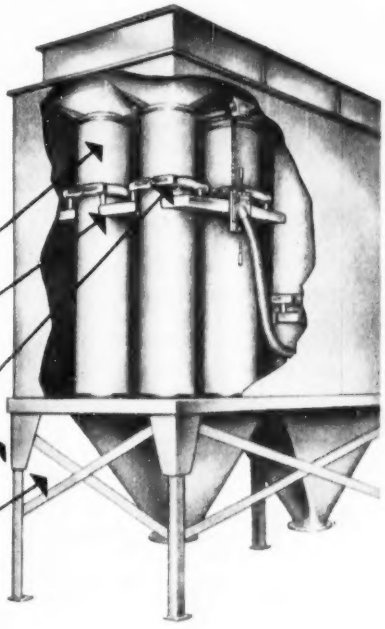
AEROTURN is proud to announce its NEW series 12 Dust Collector, the result of eight years of intensive research and successful application in more than 40 industries. Produced under Hersey Patent Rights and pioneered by the Turner and Haws Engineering Co., Inc. of Boston, AEROTURN is industry's most advanced, automatic, self-cleaning dust collector. A high volume air cleaning rate at a substantial, dollar-saving economy is produced by AEROTURN'S fully automatic, pressure regulated, reverse-air-jet cleaning operation.



NEW Series 12 features include:

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2 FAMOUS HOISTS

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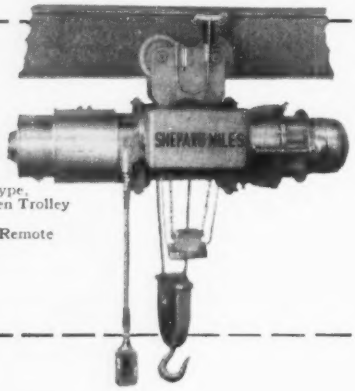

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CONTROLS: Pendant Rope, Push Button, Outrig, Remote

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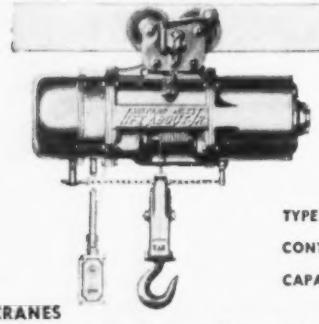

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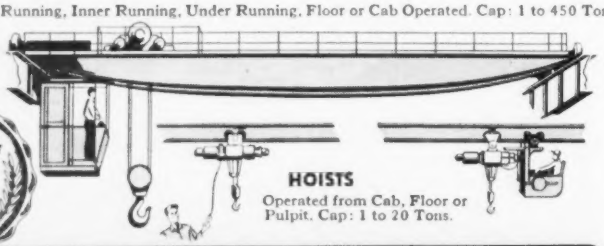

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is a chemical one. If, on the other hand, the syrup becomes turbid after a day or so, then the difficulty might be due to microbiological action.

In the event that turbidity is due to biological growth, then contamination is probably attributed to the color or flavor solutions. Adding these nonsterile solutions to a cooled syrup will defeat the purpose of pasteurization—heating syrup, water, citric acid, and agar to boiling point. If this is true, a suggested remedy is to pasteurize the bottles of syrup.

Turbidity might also be caused by a chemical or physical-chemical reaction, which takes place after flavor, color, or both are introduced. It is possible that an organic compound, employed as the base or carrier of color or flavor, may be responsible for the turbidity. If this is true, then contact the supplier of the color and flavor for trouble-free formulations.

To trace the cloudiness to flavor or color, prepare a small experimental batch of syrup. To one portion add color, to the other introduce the flavoring agent. If only one becomes cloudy, then the offending ingredient will be known. There is a slight possibility that both the coloring and flavoring agents will react to produce turbidity.

Agar should not be overlooked as a possible cause of turbidity. Addition of agar is unnecessary, provided sufficient sugar is used for sweetening and thickening purposes.

Another experimental batch of syrup could be prepared with all ingredients except agar. If this batch remains clear, then it is possible that agar is the source of trouble.—*Arthur S. Levine, Associate Professor, Dept. of Food Technology, Univ. of Mass.*

About Dietary Foods

Question — We are considering manufacturing special dietary foods—particularly jellies—which will contain sorbitol and mannitol as sweetening agents. Can you furnish us with information on the necessary labeling requirements?

Answer—Special dietary foods must be properly labeled so as to conform with federal and state regulations which may apply. Customarily, such regulations require a complete listing of the amounts of fat, protein, and carbohydrate in the food, together with caloric values per unit expressed for each of these three categories.

Some state regulations for certain foods, which are specifically prescribed for diabetic patients, require no more than half the glycogenic carbohydrate content normally present in these foods. Also, certain labeling and other

requirements must be observed if non-nutritive sweetening agents, such as sucaryl or saccharine, are employed.

Sorbitol and mannitol, which are sweet and nutritive hexahydric alcohols produced by the reduction of sugar, are useful in special dietary foods. They are also often used in conjunction with a non-nutritive sweetening ingredient.

Sorbitol and mannitol provide a more natural character (with respect to bulk and flavor) to dietary foods. Although sorbitol and mannitol are glycogenic and nutritive, they are absorbed and metabolized by the body more slowly than sucrose, dextrose, or glycerine. It is this characteristic which makes them preferable to sugars for diabetic patients.

Caloric values are 4 for sorbitol and 2 for mannitol. These values should be calculated and included on the label as carbohydrate calories. As supplied in a 70 percent solution, sorbitol should be listed as 2.8 calories per gram.

It is recommended that labels covering special dietary foods with sorbitol and mannitol should include a statement that these ingredients are sweetening and dietary adjuncts, which are slowly utilized as carbohydrates. This statement should also infer that sorbitol and mannitol are considered as carbohydrate calories.

In formulating a food containing sorbitol and mannitol, make certain that its laxitive threshhold is checked to avoid excessive amounts which are likely to be troublesome. As is the case with several sugars, excessive amounts of sorbitol and mannitol induce laxative effects.—*C. D. Pratt, Atlas Powder Co., Wilmington, Del.*

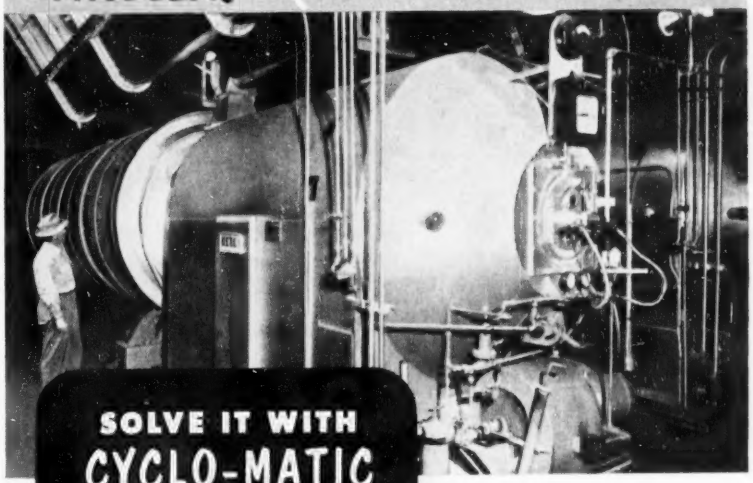
On Modern Cleaning Techniques

Question—We operate a small pork-cutting and sausage plant, and I have recently been assigned the task of improving our present cleaning practice. Our procedure merely involves assigning two porters to the task of scrubbing equipment and floors with soap and water at the end of each day's operation. The soap is then rinsed off. I am not a chemist, so I don't know what books to read to evaluate the different types of detergents that might be employed in an improved plant-cleaning program. Would you brief me on the various available detergent, their properties, and how they can best be used? I might further add that our water is extremely hard.

Answer—Our suggestion is that you contact your local supplier of industrial cleaning materials. He will not only furnish you with the proper de-

WHAT'S YOUR DEHYDRATING PROBLEM?

Cost? Product Quality? Space Limitations? Vitamin Loss? Uniform Color and Dryness? Fuel Consumption? Installation?



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- INERT TO ALL FOOD ACIDS, ALKALIS, DETERGENTS
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- WATER PROOF
- NON-FLAMMABLE

Teflon*, duPont's wonder plastic fabricated by the United States Gasket Company, is solving problems in food processing that no other material could handle.

For instance, as pump impellors, that won't gall and freeze on the most difficult solutions. As no-lubricant, non-contaminating bearings and bushings. As non-contaminating pump and valve packings. As durable sanitary Gaskets, expansion joints and accessories for glass and stainless steel piping. As non-sticking coverings for header rolls on bakers' dough sheeters. As permanent candy molds replacing starch. As sanitary work surfaces and coverings for conveyors, guide rails, trays, etc. that wipe clean of the stickiest substance. Etc., etc.

Keep Teflon's unique properties in mind. It is available in sheets, tape, rods, cylinders, tubing, blocks, engineered packings, cut and molded gaskets and machined or molded parts to your specifications.

Tell us your problems. Our engineers will work with you to solve them.

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tergent but also with recommended cleaning techniques. These suppliers have a well-qualified technical service force who will thoroughly study your problem.

Nevertheless, here is a summary of detergents designed to remove soil and condition water used for cleaning purposes:

Only a few years ago, the main ingredients used in detergents were the basic alkalies—caustic soda, soda ash, and sodium metasilicate—which are greatly limited in cleaning efficiency.

Due to its extremely high active alkalinity, caustic soda is an excellent saponifier. But its ability to rinse well and perform other important cleaning jobs is poor. Soda ash is a milder alkali and it, too, has poor cleaning properties. As a detergent, sodium metasilicate is superior to caustic soda or soda ash, and it is less corrosive.

Phosphates, another group of chemicals employed in the manufacture of detergents, comprise the basic phosphates and sodium polyphosphates. The former include mono-, di-, and trisodium phosphates, while the latter consist of tetrasodium pyrophosphate, sodium tripolyphosphate, sodium tetra-phosphate, and sodium hexametaphosphate.

The basic phosphates—particularly trisodium phosphate—have certain excellent detergent properties. While trisodium phosphate, when used alone, softens water, it forms a cloudy solution and deposits film residues on equipment.

Polyphosphates are extensively used in cleaning formulas to prevent precipitation of the hard-water constituents calcium, magnesium, iron, and carbonates. They also have excellent suspension, emulsification, sequestration, peptization, and deflocculation properties. Use of the polyphosphates in detergents can be altered according to the nature of the water supply and the soil to be removed.

Wetting agents have markedly improved detergents. Of the three types of wetting agents—anionic, nonionic, and cationic—the former is extensively used in the formulation of detergents. Because of their particular properties, the nonionics are beginning to find more use in detergents. The cationics —quaternary ammonium compounds —are chiefly used as germicides instead of wetting agents.

These wetting agents are employed to remove fats, penetrate soil deposits, and improve suspension and dispersion properties.

In your case, your supplier may recommend a detergent with sufficient polyphosphates, which will prevent deposition of hard-water salts on equipment. During rinsing operations, especially when hot water is

used, these salts must be sequestered (segregated), otherwise they will precipitate. Much of this difficulty can be elimintaed by injecting 1-10 ppm. of polyphosphates into the water supply with a proportioning unit.

Mineral and organic acid type detergents will also eliminate hardwater deposits. The mineral type hydrochloric, sulphuric, and phosphoric acids, however, corrode equipment. Mixtures of the organic type citric, gluconic, acetic, and levulinic are noncorrosive.

Detergents may be applied to surfaces by means of sprayers, fogging guns, jet rinsers, or steam cleaners.

Faster, more efficient cleanups can be accomplished with a portable, high-pressure jet cleaner. Detergents can easily be added to the jet system as a cleaning aid. The high pressure (80-300 psi.) in the detergent stream is the secret of the jet's effective cleaning action. It provides an hydraulic impact which loosens the dirt that previously required considerable hand scrubbing. And the elevated water temperature (up to 205 deg. F.) as well as the detergent, soften up the dirt.

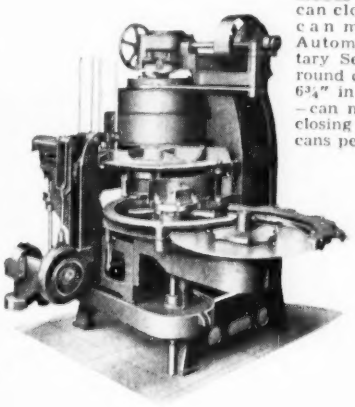
Making Guava Jam and Jelly

Question—We have been attempting to manufacture a quality guava jelly, but have run into considerable difficulty. The final batch has a poor color and flavor. Also, most of the pectin has been hydrolyzed, with the result that the product doesn't set. We believe that excessive cooking is responsible for these adverse changes. Our method calls for cooking equal parts of fruit and water about 1 hr. and then straining the hot liquid through cloth. Soluble solids content of the liquid at this point is 4 percent. To comply with federal standards (45 to 55 ratio of juice to sugar), we add 31¾ lb. of sugar to 50 lb. of extracted liquid from the cooked fruit-water mixture. The batch is then cooked to a soluble solids content of 65 percent. Have you any suggestions on how we can produce a guava jelly by overcoming these adverse changes in color, flavor, and pectin content? And can you advise a method of producing a stone-cell free guava jam?

Answer—You hit the nail on the head when you said excessive cooking was the possible cause of your difficulty. To overcome your difficulty, we suggest that you proceed in this manner:

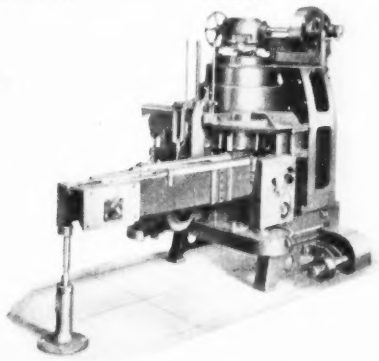
Cook equal parts of guava and water until the fruit is soft. Strain the liquid through cloth and cook with a new lot of fruit. Again strain the liquid and cook with still another lot of fruit.

Angelus Automatic Seamers for round cans are available in a wide variety of styles with capacities ranging from 30 to 400 or more cans per minute, disc feed and straight line feed, can rotate or head rotate type, for vacuum or non-vacuum closing. Angelus Seamers, the result of more than 40 years of specialized experience in development and production, are the ultimate in simplified, functional design that assures minimum investment, minimum production costs and minimum maintenance.



MODEL 50-P—For can closing and can making. Automatic Rotary Seamer for round cans 5" to 6¾" in diameter—can making or closing up to 150 cans per minute.

MODEL 59-P-MSLF—Chain feed for can closing only. Automatic Rotary Seamer for round cans 5" to 6¾" in diameter—can closing up to 150 cans per minute.



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Liquid strained from the third cook will have a soluble solids content of 7.7 percent. At this solids reading, the liquid extract may be used without any correction, i.e., 45 lb. of "juice" for each 55 lb. of sugar.

Now rapidly boil the batch in a steam-jacketed kettle until the temperature reaches 221 deg. F. At this point, check the soluble solids with a refractometer. If the soluble solids content is slightly above 65 percent, then skim off scum and fill hot into jars. Seal the jars and allow the jelly to set to a gel.

Gelling will occur if there is enough pectin in the extracted fruit liquid. However, it is best to test for pectin content prior to cooking. If there is not enough pectin, then more should be added during the latter stages of cooking.

To manufacture a stone-cell free guava jam, it is first necessary to prepare a guava puree. Then add the required amount of sugar, and cook the batch to slightly over 65 percent soluble solids.

To make the puree, run the sorted, washed fruit through a pulper, which is equipped with an 0.033-in. screen. Keep the waste gate fully opened for seeds and fibrous matter. For maximum yield, operate the pulper at medium speed and set the paddle blades at a slight pitch to produce a fairly dry waste.

After removing the seeds, wash the pulper and install an 0.014-in. screen. Now slightly decrease the pitch on the paddles and operate the pulper at maximum speed. Then add the puree at a steady rate. This second run through the pulper will remove the stone cells. A puree free of stone cells will assure you of a jam with smooth texture, good flavor, and excellent color.

In preparing the jam, add 45 lb. of puree and 55 lb. of sugar into a steam-jacketed kettle. Cook to 221 deg. F. or soluble solids content of 65 percent. Fill hot into jars, which are then sealed.

We have been told that a superior quality jam can be made by using equal amounts of sugar and puree.

Re Freshness of Fish

Question—Do you know the amount of trimethylamine nitrogen in fish flesh which may be considered an indication of spoilage?

Answer—A value of 15 mg. of trimethylamine nitrogen in 100 g. of fish is generally an indication that the fish is not salable. This figure applies to certain bottom fish in the northwest Atlantic area.

Using a spectrophotometric method

Winnen Incinerator

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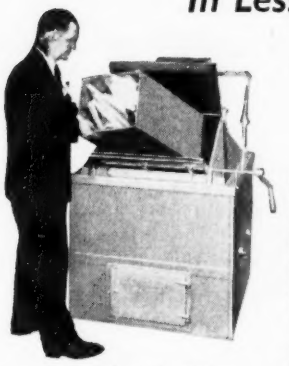

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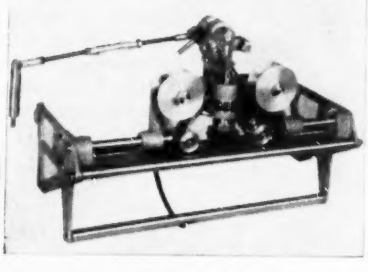

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- The above illustration is for the Hayssen Machine. Variations of the above have been made for Battle Creek Stokes, Wrap, Trans Wrap, Hudson Sharpe and similar machines.
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Why continue taking shrinkage losses in your cold storage room—losses caused by forced air cooling? You can cut shrinkage to a minimum and protect the quality of your products by using DOLE refrigeration—the system that cools by *direct contact* and *natural* air circulation. *For complete information ask for catalog E-8.*

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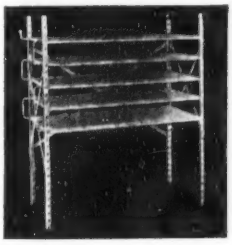
Quick Freeze Plates are available as stands which can be installed in any cooling room to provide faster freezing and preservation of your perishables.



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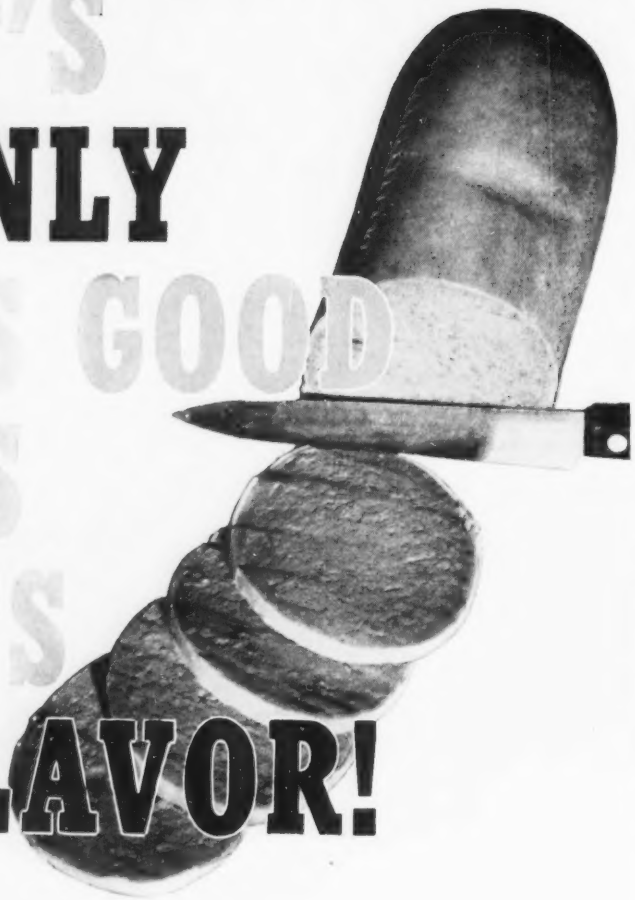

NO LONGER is the sausage meat manufacturer dependent upon the vagaries of nature or of man for the proper seasoning of his products. Pure, full-flavored spice oils and spice extractions, scientifically blended to produce the precise taste effect desired, now provide the economical, easy-to-measure means of achieving flavor perfection and day-after-day uniformity of product. Truly, as leading food manufacturers say, there is a big eating difference in products so flavored. If you want that difference on your side, come to FRITZSCHE . . . .
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for determining trimethylamine in fish, U. S. Fish & Wildlife researchers recently came across some interesting findings. When frozen fish were thawed and then held at 40 deg. F., only small increases in trimethylamine occurred. Fish judged to be badly spoiled (on the basis of odor and appearance) had a maximum trimethylamine nitrogen content of only 8 mg. per 100 g. of fish.

After repeating the tests, but this time with fresh fish held at 40 deg. F. until spoilage took place, the trimethylamine nitrogen content was about 46 mg. per 100 g. of fish.

Evidentally, freezing may have been responsible for the failure of trimethylamine to form after the fish were thawed and held until they spoiled.

More on Soupy Tomatoes

Here's an answer to your January problem on soupy tomatoes:

Heating increases pectin and pectic acid (or pectates) and decreases protopectin and total pectic substances in fruits or vegetables. As a result, the plant tissues become less firm.

This loss of firmness can be prevented by calcium treatment. The tissue-firming role of calcium is not clearly understood, but its effectiveness is believed to be attributed to the formation of calcium pectate or pectinate gels.

It can be added in the form of calcium sulfate-table salt tablets to cans of tomatoes. Permissible quantity in the U. S. is 0.07 percent calcium chloride, or an equivalent quantity of other calcium salts, such as citrates and phosphates.—*P. N. Pandhi, The British Food Manufacturing Industries Research Assn., Surrey, England.*

More on Pectin Problem

Referring to your February Q&A, "Dark Pectin Problem," it was noted that enzyme treatment of the pectin liquor before filtration was not mentioned.

Starch gelatinizes during cooking and extraction of pectin from apple pomace. Unless this starch is converted into sugars, filtration of the decolorized liquor will be difficult. Starch, proteinaceous, and other colloidal particles do not agglomerate and settle out. As a result, they slow down filtration—even bringing it to a complete standstill.

Even if the liquor can be filtered, the starch-containing filtrate will not be clear and brilliant and, therefore, unsuitable for jellies.

To de-starch the liquor (convert the starch into soluble sugars), add

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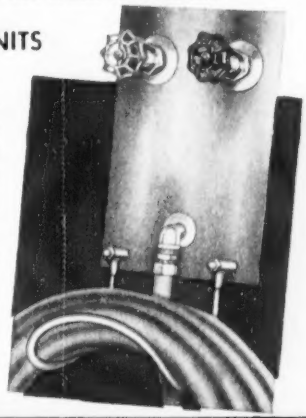

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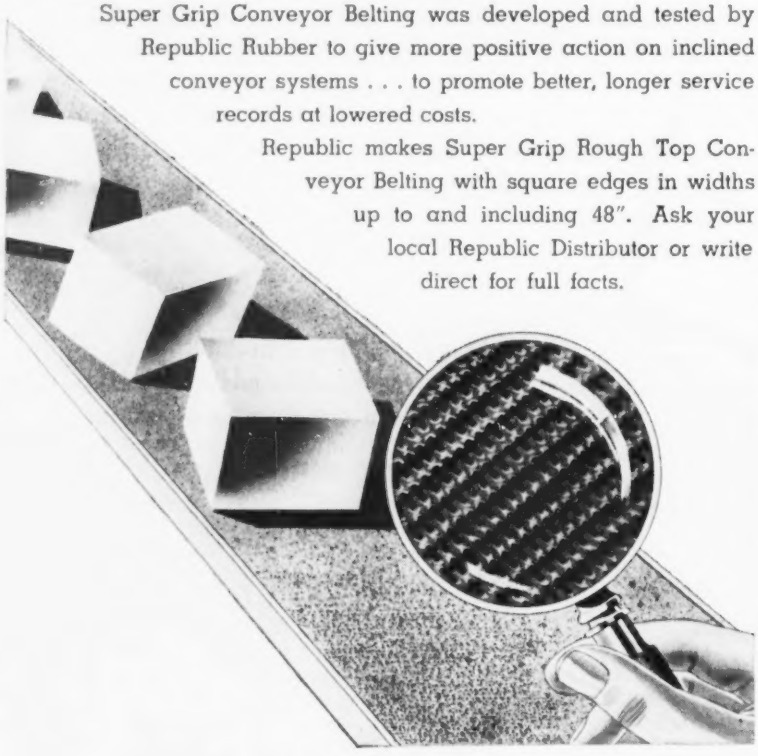
Republic makes Super Grip Rough Top Conveyor Belting with square edges in widths up to and including 48". Ask your local Republic Distributor or write direct for full facts.



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1 lb. of the enzyme, Clarase, to 10,000-15,000 lb. of liquor. The amount of enzyme required, of course, will depend upon the quantity of starch in the liquor.

Before adding this enzyme, it is important to cool the liquor to 80-90 deg. F. Higher temperatures inactivate the enzyme.

Since the enzyme is specific for starch, it will not break down the pectin, nor will it adversely affect the gel strength of the liquor.

De-starching usually takes about an hour. Samples should be iodine-tested at intervals to note the progress of the reaction. As long as any unconverted starch remains, the iodine color will be blue or bluish violet. And as the starch digestion progresses, the iodine color will become brown or reddish brown. This is the end-point for conversion of starch to sugars.

To prepare the iodine-test solution, dissolve 1.8 g. of iodine in 80 ml. of water. Then introduce 1.27 g. of iodine, and intermittently mix until dissolved. For use, dilute 30 ml. of this stock solution with 70 ml. of water.

Subsequent carbon treatment at about 165 deg. F. inactivates the enzyme remaining in the pectin liquor. —*Eric G. Snyder, Takamine Laboratory, Inc., Clifton, N. J.*

Re Sour Cream Dressing

Question—We are interested in manufacturing a sour-cream salad dressing. Can you suggest how we can go about making this product?

Answer—We assume that you are interested in processing a cultured cream similar to that long favored as a salad dressing by peoples of the Near East. If so, proceed in this manner:

Standardize the cream to 18+ percent fat, and pasteurize at 165 deg. F. for 30 min. If the cream has been previously heat-treated, reduce the pasteurizing time to 10 min.

Now homogenize the cream at pasteurizing temperature and a pressure of 2,500 psi. Heat again to 165 deg. F., and homogenize a second time under the same pressure . Cool to 72 deg. F., and add 1 pt. of butter culture and 0.5 ml. of rennet mixed with 75 ml. of cool water to each 10 gal. of cream. It is important to vigorously stir while adding the rennet.

Hold the cream at 72 deg. F. for approximately 15 hr. Adjust the ripened cream to an 0.60 to 0.65-percent acidity (expressed as lactic acid). Then cool to 35 to 40 deg. F. in a chill room. The cooled cream should be gently agitated to assure a uniformly smooth and creamy product prior to packaging.

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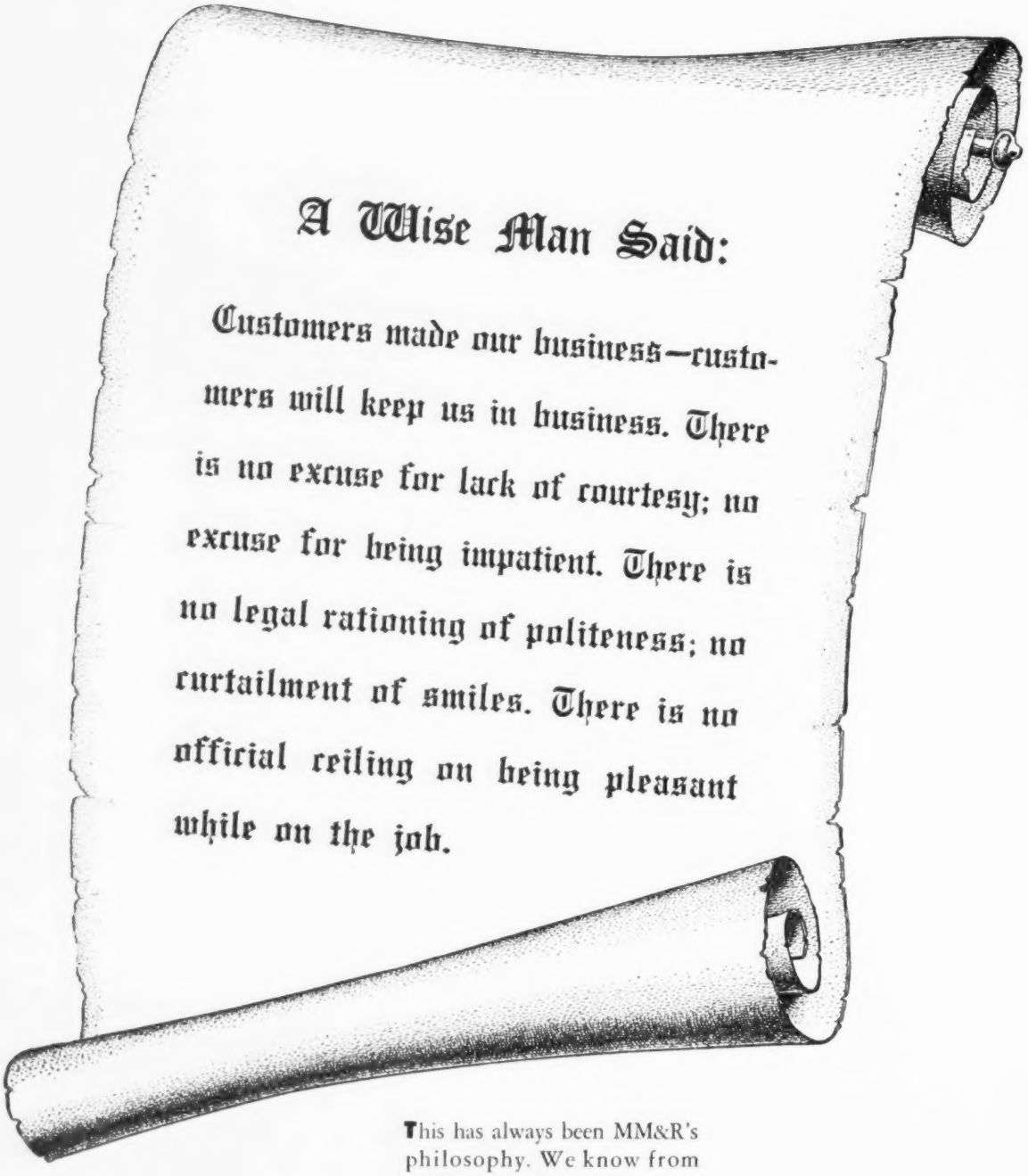
A Wise Man Said:
Customers made our business—customers will keep us in business. There is no excuse for lack of courtesy; no excuse for being impatient. There is no legal rationing of politeness; no curtailment of smiles. There is no official ceiling on being pleasant while on the job.

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Bags to Process by Air

—Continued from page 69

of ingredients in sacks, which are then handled from pallet to dump-bin in conventional manner. However, after dumping, air conveying takes over to pneumatically route the ingredient through a sifter, into a storage bin, and to the mixer or process.

Throughout the entire system the product is untouched by human hands. All metal construction throughout also insures sanitary conditions. For example, the sifter is fabricated of metal completely and has no nooks, crannies, or ledges where flour can lodge. Employed is a pure gyratory motion to give maximum sifting efficiency.

Piping from storage bin to mixer scale hopper is so arranged that flour which has been in the bin longest will be removed first. This precludes any product stagnation.

End (*Resume reading on page 70*)

Better Broilers Processed

—Continued from page 78

batches in an enclosed unit having a revolving metal plate on the bottom. This washing takes about a minute, whereupon the batch is discharged from a hand-operated gate at the side.

Each batch of gizzards, hearts, and livers is loaded into a rectangular, perforated basket, which is placed in the center of a chill vat.

Chilling to 38-40 deg. F. in slush ice is accomplished in about 45 min. It is hastened by air pumped into the vats—another Swift innovation. Former chilling of giblets took about 4 hr.

Whole Cut-Up Line

Coming from the chill vats, the chickens are attached to J-hook shackles, mounted on overhead conveyors, and carried to two lines—one for whole cut-up chickens and the other for cut-up parts.

Chickens weighing 1 lb. 8 oz. to 2 lb. 2 oz. are packed in No. 1 cartons. Those weighing 2 lb. 4 oz. to 2 lb. 14 oz. are put up in No. 2 cartons. Those larger than 2 lb. 14 oz are packed as roasters in Cry-O-Vac bags.

For the purpose of identification, broilers weigh 1 lb. 12 oz. or less. Fryers are in the 1 lb. 14 oz. to 2 lb. 14 oz. range.

Here are detailed operations on the whole cut-up chicken line:

Cartons are machine-formed and delivered to the line. Girls bag the gib-

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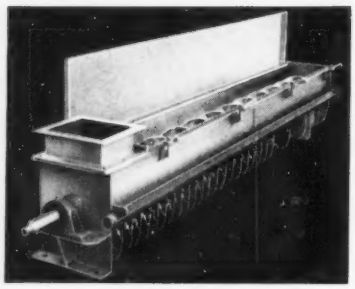
CASE HISTORY SERIES

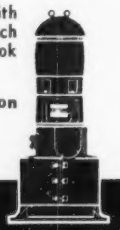
STEAM BLANCHING AND COOKING MUSHROOMS



A TLXK-12 x 10 stainless steel Rietz Thermascrew Blancher using ⅓ H.P. handles 1500 lbs. of white mushrooms per hour. The unit incorporates steam jets in the bottom and side of the trough. Continuous steam blanching is efficiently carried out while the mushrooms are gently conveyed through the unit by the action of the screw. This unit has replaced basket type blanchers and has reduced the cooking time almost to one-half that formerly required.

In another installation, 3 TJK-12 x 12 Rietz Thermascrew cookers with ½ H.P. are each handling 800 lbs. of mushrooms in cooking service. Each unit has a jacketed trough and hollow screw making it possible to cook continuously with a shorter cooking cycle.

Write for free technical literature covering the above installation



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lets—a heart, liver, and gizzard to each bag. Another girl puts a bag of giblets into each carton.

Girls disjoint legs, wings, backs, and breasts as the chickens are traveling on the line. A band saw is used to cut off the neck and remove the back from the breast. Parts are arranged and inspected in cartons. Each carton is then check-weighed.

Black squares on the scales cover odd weights—1 lb. 7 oz., 1 lb. 9 oz., and the like—to enable weighing in even ounces.

To facilitate price-marking in the store, cartons are packed one size to a shipping case, and the weight is wax-penciled on the outside of the case.

Cartons are packed 6, 12, or 24 to a case. Gross and net weights are stenciled on the case, which is then check-weighed. To speed weighing, the girl checks the gross weight from a chart adjacent to the scale. Assume, for example, the weight of a consumer-size carton is 2 lb. 6 oz. Then the gross weight for twelve cartons in the case is quickly read from the chart—28 lb. 8 oz.

Cut-Up Parts Line

Now to cut-up parts operations—

Passing an inspector, chickens have their legs cut off, and these are passed onto a waist-high conveyor. Further along the line, a girl disjoints the legs and places the thighs and drumsticks in an overhead packing bin. Thighs are packed into 1-lb. cartons. Drumsticks are packed the same way.

Continuing with the operation, one girl removes one wing and places it on a conveyor. Another girl cuts off legs not previously removed by operators. These legs are disjointed and packed in the manner already described.

One girl cuts the remaining carcass from the chickens, leaving only a wing on the J-hook. Using band saws, girls remove the back and split the breast. Breasts are packed into cartons from two bins.

Backs and necks are packed 20 lb. to a polyethylene bag. And three bags are ice-packed for shipment in celery crates. Wings are then packed from bins into cartons.

Cartons of wings, of breasts, of thighs, and of drumsticks are packed twelve to a shipping case, which is then check-weighed.

Cases containing chicken in parts and cut-up whole are quick-frozen in three blast freezers, each holding 70,000 lb. Temperature of the freezers is −30 to −40 deg. F., and freezing takes about 12 hr. Frozen poultry is then removed to a −15-deg.-F. storage room, ready for shipment.

End (*Resume reading on page 79*)

Useful New Books & Government Publications

Food Poisoning

FOOD-BORNE INFECTIONS AND INTOXICATIONS. *Second Edition. By Fred W. Tanner and Louise P. Tanner. Published by The Garrard Press, Champaign, Ill.* 1953. 769 *pages;* 6x9¼ *in., cloth. Price* $12.

The common problem of gastrointestinal disturbances from foods has many causes and solutions. This book deals with many of these, extensively examining process sanitation, ptomaine through putrefaction of food, poisonous plants, fungi, infestation, virus-borne food infections, and metals in food. The comprehensive work is fully indexed both by subject and by cited authorities.

The author, Fred W. Tanner, is a recognized authority and teacher in the field of food microbiology and is presently emeritus professor of bacteriology at University of Illinois. He is also the writer of the authoritative volume, *Microbiology of Foods.*

Working with him on this new book has been his wife, Louise P. Tanner, who has had wide experience in the food field and is a former Associate in Home Economics at University of Illinois.

Glycols in Industry

GLYCOLS. *Edited by George O. Curme & Franklin Johnson. Published by Reinhold Publishing Corp.,* 330 W. 42*nd St., New York* 36. 1952. 839 *pages;* 6¼x9¼ *in., cloth. Price* $12.

Commercial production of glycols and their applications, physical properties, oxides, derivatives, and condensation polymers are covered in this volume, with manufacturing techniques receiving particular attention. Book presents toxicological data and analytical methods, and there are supplemental charts and tables.

Prepared by research staff members of Carbide & Carbon Chemicals Co., volume is edited by two well-known chemists.

Glycerol Monograph

GLYCEROL. *Edited by Carl S. Miner and N. N. Dalton. Published by Reinhold Publishing Corp.,* 330 W. 42*nd St., New York* 36. 1953. 460 *pages;* 6¼x9¼ *in., cloth. Price* $12.

Part of American Chemical Society's monograph series, book offers complete information on sources, recovery, refining, and uses of glycerol. Among facets dealt with are synthetic glycerol and purification by ion exchange.

Uses of glycerine in food and beverage industries and analysis of glycerol in foods are also explored. A completed chapter on standards and specifications is offered. Indexed.

Re Condenser Standards

STANDARD FOR STEAM SURFACE CONDENSERS. *Published by Heat Exchange Institute,* 122 E. 42*nd St., New York* 17. 20 *pages;* 8½x11¾ *in., paper. Price* $2.

This is a completely rewritten and revised edition of the original work published in 1939 and 1940.

Object of the publication is to assist purchaser of condensers by defining essential terms and by setting up definite standards of heat transfer rates and performance guarantees. It contains material which is especially useful to engineers when writing specifications or designing surface condensing equipment.

UN's FAO Reports

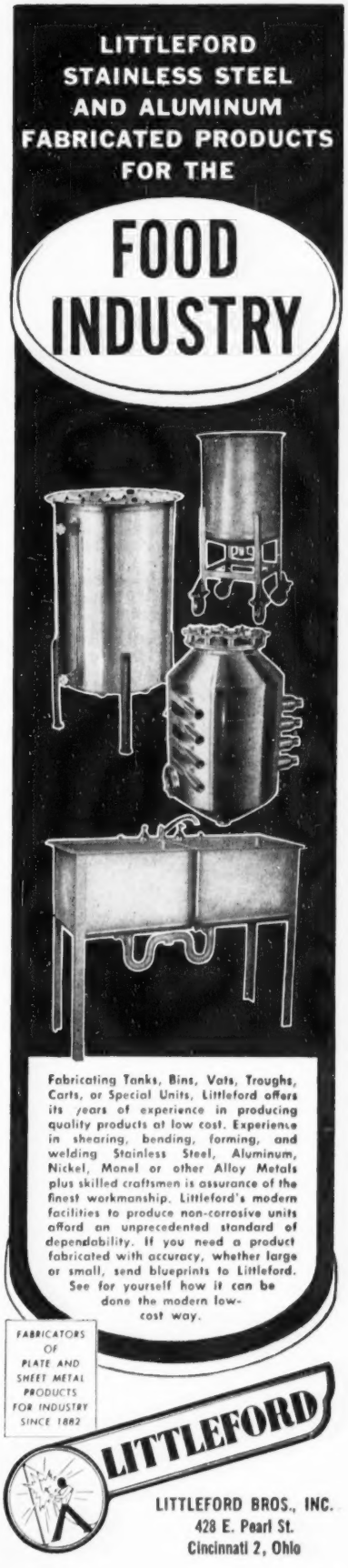
THE STATE OF FOOD AND AGRICULTURE: REVIEW AND OUTLOOK. 1952. 126 *pages;* 8½x11 *in., paper. Price* $1. FRUITS AND VEGETABLES PRODUCTION, TRADE AND POLICIES IN EUROPE. 1947-1951. 1952. 143 *pages;* 8½x13 *in., paper. Price* 50¢. SECOND WORLD FOOD SURVEY. 1952. 60 *pages;* 8½x11 *in., paper. Price* 50¢. *Published by Food & Agriculture Organization of the United Nations, Rome, Italy, and distributed in U. S. by Columbia University Press,* 2960 *Broadway, New York* 27.

The FAO was established in 1946 as an agency through which governments could work together in the task of enabling people of all countries to have enough of the right kinds of food and to enjoy adequate standards of living.

Facts and figures, systematically assembled, were needed to measure and evaluate these problems. And this became the work of the FAO. Among the most recent compilations are the above reports.

The first mentioned book is a graphically illustrated work reviewing the present world situation and future outlook of food and agriculture. The information was based on statistics and data secured from many countries.

The book on fruits and vegetables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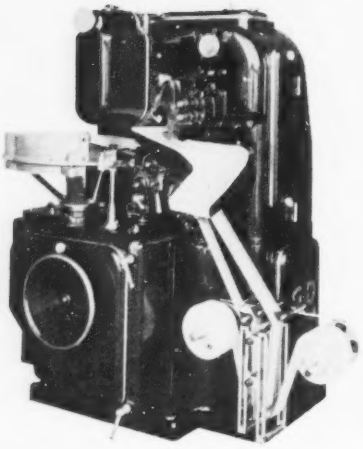

With the G.D "2250", one operator can wrap any shape of preformed hard candies in plain or paraffin paper, cellophane, foil or cellophane and foil, with either a double bow-twist, single bow-twist or side bow-twist. Semi-automatic feed permits wrappings such as these at speeds up to 250 a minute.

Variable speed controls and easily changeable feeding plates make the G.D "2250" adaptable for handling candies of different sizes, shapes and consistencies. One operator, without special skills, can quickly make the necessary changes.

Built for long, trouble-free operation, all working parts of the G.D "2250" are protected but still easily accessible for necessary maintenance.

These are but a few of the many advantages you'll find in the G.D "2250" . . . write today for the complete details.

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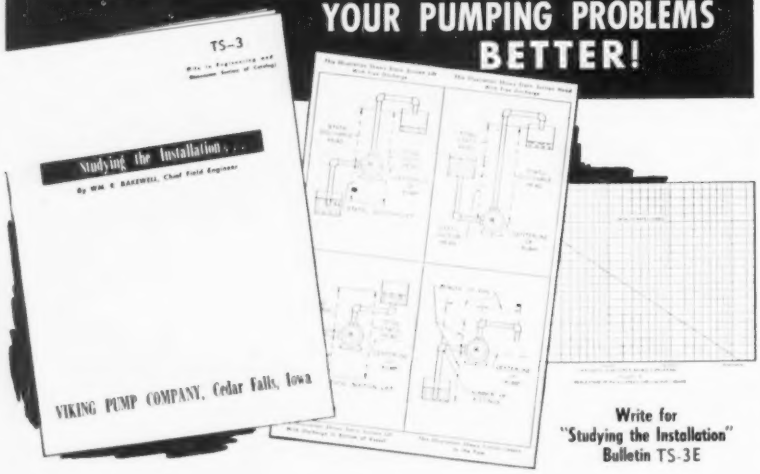


Write for "Studying the Installation" Bulletin TS-3E

This 8-page booklet, "Studying the Installation," is yours for the asking. It contains important facts you should know and consider, when selecting the proper pump, and when making an efficient, successful pump installation.

See Our Catalog In SWEETS

Viking PUMP COMPANY

Cedar Falls, Iowa

covers a survey of the production and trade in fruits and vegetables in approximately 25 European countries.

And in the world food survey publication the postwar situation is reviewed, with food consumption targets for 1960 projected. Here are set forth methods of achieving success as well as problems and possibilities involved. Twenty pages of appendices graphically show areas involved, yield and production of major crops, food supplied per head, caloric and protein content of national average food supplies, and gross food supplies. Also, regional and subregional groups involved are listed.

Government Publications

FOUR PAMPHLETS—THE WORKER AND HIS HEALTH, PRODUCTION AT ANY AGE, A JOB FOR WOMEN, THE DISABLED CAN WORK. *Office of Defense Mobilization, Health Resources Advisory Committee, Washington 25, D. C.* First pamphlet deals with value of in-plant health programs to reduce sickness absenteeism. Other three pamphlets report value in reducing labor turnover in employment of older workers, the handicapped, and women.

HAZARDS IN OPERATING BAKERY MACHINES (Occupational Hazards to Young Workers, Report No. 11). *Bureau of Labor Standards, Bulletin No. 160.* 22 pages, 15c. Describes hazards to 16- and 17-yr. old workers, pursuant to Hazardous-Occupation Order No. 11, effective July 21, 1952.

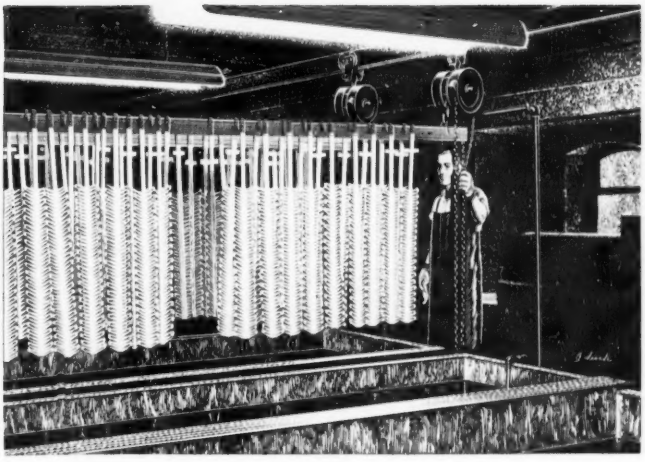
These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

A STUDY OF THE WASHING AND STORAGE OF DIRTY SHELL EGGS. *USDA, Circular 911,* 32 pages, 10c. Reports a survey of egg washing procedures and equipment in 31 commercial plants, concluding that soiled eggs (washed or unwashed) are poor storage risks.

TRANSPORTATION AND HANDLING COSTS OF SELECTED FRESH FRUITS AND VEGETABLES IN THE SAN FRANCISCO BAY TERMINAL MARKET AREA. *U. S. Dept. of Agriculture Report No. 2.* Price 35c. Reports facts on market movements of fresh fruits and vegetables and suggests methods to improve practices.

Servel

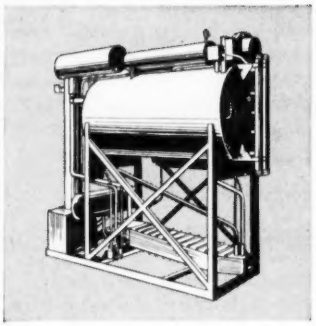
WELCOMES...and SOLVES



tough industrial cooling problems

When Colonial Alloys Company of Philadelphia decided to anodize aluminum products by the new and different Electrodizing Conservation or "EC" process, it faced the problem of maintaining proper temperature of the electrolytic bath solution.

To meet this essential requirement, Colonial Alloys chose a Servel 25-ton Water Chiller. Not only does this single Servel Air Conditioning unit maintain constant, controlled solution temperature, but it also provides office air conditioning, chilled water for experimental work, and cold drinking water.



The 25-ton Water Chiller used in the Servel installation at Colonial Alloys Company.

Colonial Alloys reports that the new "EC" process, in which Servel equipment plays such a leading part, has *increased aluminum anodizing production as much as five times, while cutting costs as much as 99%!*

This is one of many examples of how Servel Air Conditioning equipment benefits industry. Chances are, your problem can be solved in an equally satisfactory manner. Because Servel Air Conditioning *uses heat to produce cold*, operating economy is outstanding. It operates on gas, oil, steam or waste heat—whichever is the most economical fuel in your area. There are *no moving parts* to wear or cause vibration. And every Servel unit carries a complete *five-year warranty*.

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Servel manufactures the world's finest air conditioning equipment to fit all air conditioning needs—residential, industrial, commercial—all-year or cooling alone. For complete information, clip and mail the coupon today.

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INTERNATIONAL TRUCKS

"Standard of the Highway"

KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Weigh "L" Milk Test

Experiments in practical application of the lactometer test, developed by USDA scientists last year, for measuring solids-not-fat content of milk are under way at University of Maryland. Project is financed by an initial $5,000 grant by American Dairy Assn.

Primary tests by USDA chemists have shown the method to be accurate within 0.1 percent when compared with slower gravimetric system. If this is verified in the present research, it could be used in conjunction with or even replace the Babcock test as a method of determining the price to be paid for milk.

Mold-Reducing Method

A new washing technique said to reduce mold count on strawberries by more than 50 percent has been developed by researchers of University of Tennessee and Monsanto Chemical Co.

Best results were obtained by use of a new type unit that gently forces fruit up and down in detergent solution as it moves the length of washer. Addition of small amounts of special detergents that impart slight bactericidal properties to wash water are a part of the technique.

Oppose Dairy Synthetics

Strong opposition to use of vegetable oils in manufactured dairy products was voiced in recent sessions held in Victoria, B.C., by the Western Federation of Agriculture and Canadian Federation of Agriculture.

Contending that such oils are being used in milk, evaporated milk, table and whipping creams, and cheese, delegates from Canada's four western provinces are seeking legislation to ban employment of vegetable oil in dairy foods.

"Restore Inspections!"

Enactment immediately of legislation restoring FDA's authority for compulsory inspection of food processing plants was endorsed by the National Canners Assn. at its recent convention in Chicago. Grocery Manufacturers of America are also on record for return of inspection authority.

H-S Methods, Ray Sterilizing, Pesticide Residues Are Spotlighted by Canners

Advance techniques, new equipment to implement them, and pertinent processing problems got top billing at the recent 46th annual convention of the National Canners' Assn. in Chicago.

Full houses were the rule at all eleven public sessions, as some 20,000 canners assembled at the five-day show to view new machines and hear talks on operations, plant equipment, raw products, and management topics.

"High Short" Processing methods proved of outstanding interest. Discussed at a session on these techniques were continuous agitating retorts, aseptic canning, and end-over-end agitation. For complete information on these processes, see Canning Special, Feb. FE.

Other subjects highlighted were:

Aseptic Canning in Glass—Completion of the first phase of development work with use of glass containers for commercial aseptic canning was revealed by H. R. Goff, James Dole Engineering Co.

Through work with Glass Container Mfg. Institute, a prototype unit has been developed in which it is possible to sterilize glass containers and lids and cool containers in a continuous operation.

Jars are heated to sterilizing temperature, then cooled with steam to avoid heat shock breakage upon filling. This is followed by filling, using the basic aseptic canning principles worked out earlier.

Atomic Radiation—Before fission products can become industrially practicable for sterilization of food products, intensity of gamma rays must be increased more than 1,000 times today's 1,000-5,000 curie levels, according to B. H. Morgan, Washington Research Laboratory, NCA.

And there are other requirements and difficulties that must be overcome before the method can earn consideration. Among these are: Assurance that large quantities of source material will be economically available; solution of problems of secondary effects on color, flavor, odor, and nutritive values; and insurance against toxic or harmful properties being imparted to the food. (*Cont'd next page*)

Scale Models Help Budding Planners

Faced with the problem of designing a top-efficient combination fluid milk and ice cream plant, Ohio State U dairy-course students recently got very objective aid at the Cincinnati office of Cherry-Burrell Corp. The company allowed them "full play" with a comprehensive set of scale-size midget equipment used in plant layout projects. And the students came away from their day of designing with sharpened perspectives of practical unit arrangements for high-performance flow.

Is your product...

PERISHABLE?

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JIFFY INSULATED BOXES

Whatever the nature of your product—drug or dairy, cosmetics or confections, flowers or food, fish or fowl—if it is affected by heat, cold or moisture, you can rely on JIFFY INSULATION to keep it from spoiling en route.

JIFFY'S thick, built-in insulation is completely enclosed in heavy weight, moistureproof kraft. Insulate your own boxes with JIFFY INSULATING LINERS, custom made for you, or order a complete unit consisting of corrugated box and JIFFY Insulating Liner — the JIFFY INSULATED BOX.

Prices and samples on request.

See a variety of JIFFY INSULATED PRODUCTS at the National Packaging Exposition —

BOOTH 111-112

Jiffy Insulated Packaging Division
MANUFACTURING COMPANY
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These problems are under attack by various groups. But, said Morgan, until their solution is much further advanced, we are in no position to regard irradiation as a rival to our present methods of food preservation.

Vinegar Flies—Circumstances that predispose to heavy contamination of tomatoes with vinegar fly eggs and maggots are those where flies are highly prevalent and growing conditions promote cracking of tomatoes. So opined John L. Harvey, FDA Associate Commissioner.

And until such time as effective methods of eliminating fly infestation are developed, the solution of the egg and maggot problem is seen remaining similar to that which solves the problem of partially rotted tomatoes.

There is some debate about the feasibility of eliminating fly eggs from cracks in tomatoes by washing, due to the gelatinous character of the eggs. If such a method is not feasible, then these cracks are on much the same basis as rotten spots, and should be removed by trimming.

Scientific Research—New competitors are produced almost overnight because of the speed with which scientific research is moving. So said Roy C. Newton, Swift & Co.

But the company that instills its management and key employees with the desire for knowledge (fundamental research) and improvement (applied research) will be mighty hard to crowd out of the business world.

Flavor From Pesticides—Future limitations of pesticide residues may be based on effects on product flavor as well as toxicity according to consensus of a seven-member panel that discussed "The Effect of Applied Chemicals on the Flavor of Canned Foods."

Lindane and benzene hexachloride have been found to affect flavor of potatoes, peanuts, and squash. And a number of other pesticides produce some differences in flavors.

Flavor studies are now being carried out at a number of universities and experiment stations. But to make sure that the only variable is a difference in pesticide treatment, the researchers have to follow crops closely in growing, harvesting, and cooking.

New Shipping Trick

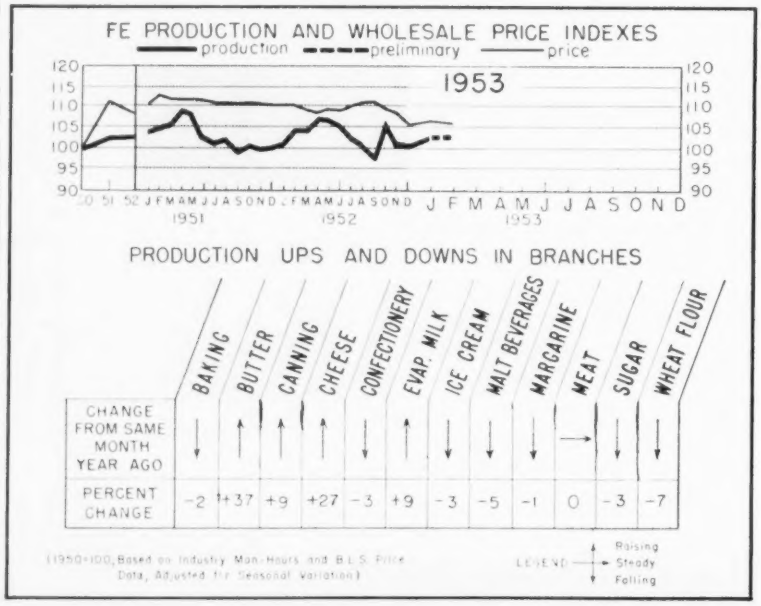
Product damage in shipment is being reduced by a unique innovation—placement of a special corrugated paperboard on the bottom of the freight car to tie together the load of cases or bags placed upon it.

Now used by at least one food company for shipments from New England to the West Coast, the technique is under consideration by others.

Big advantages are ease of application and low cost. The corrugated board is quickly put into place, and the material is re-used. Interlacing a carload of cases with tie-in paper, for example, requires much more time and labor.

Tests have shown that a load of food in cartons will open up as much as 3 ft. as a result of shifting in transit, with consequent crushing of cases. The corrugated board floor covering is said to prevent this and to avoid substantial damage to packaged products.

Called Pillo-Pak, the material is the development of Packaging Materials Corp., New York.



12 Management Winners

Certificates of Management Excellence for 1952 have gone to twelve food manufacturing companies.

Nine were honored for the third consecutive year: Corn Products Refining Co., General Foods Corp., and National Dairy Products Co., all of New York City; General Mills, Inc., Minneapolis; Great Western Sugar Co., Denver; Beatrice Foods Co., and The Quaker Oats Co., Chicago; Proctor & Gamble Co., Cincinnati; and Spencer Kellogg & Sons, Inc., Buffalo.

Second-time recipients were The Borden Co., New York City, and The Kellogg Co., Battle Creek, Mich. And new winner was Jewel Tea Co., Chicago.

Conducted by the American Institute of Management, New York City, the competition gages companies on these factors: Economic function, corporate structure, health of earnings growth, fairness to stockholders, research and development, directorate analysis, fiscal policies, production efficiency, sales vigor, and executive evaluation.

Hors d'Oeurves

► An estimated 25 million people in this country are overweight, 5 million being excessively obese. This points up the market for low-caloric foods. And in the words of Swift's President Holmes, it indicates that Americans have been eating well, if not too wisely.

► **Could be that a food-field incident will keep Malenkov and Molotov at sword's point until a foot slips. Malenkov once fired Russia's fish-industry commissar. Not unusual—except that the commissar happened to be Molotov's wife.**

► In 1950, there were 39 percent more children under 10 than in 1940. But youngsters between 10 and 19 were 8 percent fewer. The boom of the '40s accounted for the former; the depression '30s for the latter. To figure markets, food men must understand the economics of biology.

► **Profits (before taxes) for food manufacturing increased 19 percent in the last half of 1952. Good thing! The stack of chips was getting uncomfortably low.**

► Combinations of substances sometimes have higher nutritive value than all the components taken separately. So nutritionists have coined the term, "biological relativity." It has nothing to do with your family tree.

► **Three men and a corporation have been indicted by a Federal grand jury in New York for putting a "pure butter" label on margarine. Butterleggers!**

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Some steel products are in short supply but over-all stocks are still large, diversified

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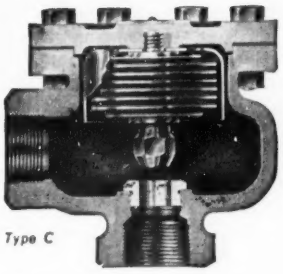
Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco, Spokane and Seattle

Nicholson Steam Traps

CUT KETTLE TIME 30%

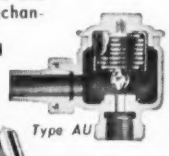
for Leading Food Packer



Type C

Records of a recent installation of Nicholson steam traps, by a large processor, show they cut kettle time 30%. For example, one operation was shortened from 65 to 45 minutes. Nicholson units keep equipment full of live steam because: 1) they operate on lowest temperature differential; 2) have 2 to 6 times average drainage capacity; 3) maximum air-venting capacity. See why leading plants are increasingly standardizing on Nicholson's thermostatic steam traps.

HIGH - PRESSURE FLOATS — Stainless, monel steel or plated steel. Welded. In all sizes and shapes; for operating mechanisms or as vessels. Quick delivery. BULLETIN



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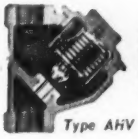

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TRAPS · VALVES · FLOATS

Warning!

Industrial skin accidents cause more lost time than broken bones

It just doesn't make sense to yell about safety in your plant and neglect occupational skin hazards from oils, acids and alkalis, which are among the most frequent and severe of all factory injuries. You're risking lost production, costly claims and good employee relations.

$147.00* — that's the average skin trouble treatment cost in some areas. If you've escaped it, you're lucky. And you know it doesn't pay to push your luck. It's real cost cutting to see that your people have protective clothing, especially gloves.

The complete line of 32 non-allergic PIONEER Stanzoil Gloves of oil-and-acid resistant DuPont neoprene are meeting every hand-skin hazard in hundreds of plants — at very low cost per hour. Don't take chances with dangerous occupational dermatitis — write *today* for new Stanzoil catalog that shows you how to choose the safe economical glove for each job!

* *"Industry's Big Itch", "Occupational Hazards", December 1952.*

Industrial Products Division

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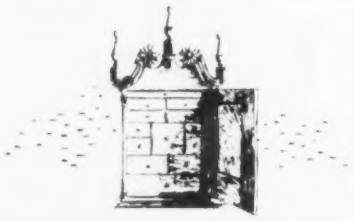
QUALITY GLOVES FOR 35 YEARS



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New Ingredients Unveiled By Bakery Engineers

Advantages in the use of new ingredients—inactivated dry yeast, egg solids, prepared mixes, and polyoxyethylene monostearate (an emulsifier)—were pointed out by speakers at the recent annual convention of the American Society of Bakery Engineers in Chicago. Highlights:

Dry Yeast—Better flavor, prolonged shelf life, and easier working of doughs are among advantages reported in using heat-inactivated dry yeast, according to Elsie Singruen, Chicago consultant. This new ingredient stimulates active-yeast fermenting power in processing. Up to 2 percent can be used without need of special labeling. Keeping the use level above ½ percent was declared extremely important for good results.

Use of dry yeast cuts mixing time 15 to 25 percent and saves time in the sponge rise, according to William H. Ziemke, San Francisco. This yeast shows promise in bake shops where rush orders are prevalent and more capacity is required.

Egg Solids—Methods have been found to preserve in egg solids the natural qualities of fresh eggs that are needed for good bakery products, reports George Carlin, Swift & Co., Chicago.

Fluff-drying, for example, preserves the natural whipping qualities of egg whites to give angel food cakes lightness and volume. And cakes made from these whites also have a desirable fine and silky texture.

Adding sucrose to yolks or whole eggs before removing water also preserves their natural whipping qualities.

Natural flavor is maintained in dried eggs by addition of an enzyme that blocks the sugar-protein reaction—reason for the undesirable flavor in dried eggs.

Prepared Mixes—Formulation errors, from batch-to-batch or plant-to-plant, can be eliminated in commercial bakeries by the use of well-controlled premixes in the opinion of A. T. Borer, Toledo, Ohio. Moreover, they are hailed as enabling the baker to simplify inventories, improve sanitation, and reduce overall accounting.

Emulsifier—"The best ingredient ever offered the baker" was the way Orvel Pettit, of Mission, Kan., described the emulsifier, polyoxyethylene monostearate. He decried the effects that the recent federal ban on this stearate would have on commercial bread baking, holding that no current, acceptable emulsifiers compare with this agent. In fact, he added, more selective flour purchasing, better ingredients, additional mixing time, longer proofing, and greater vigilance throughout baking is now required.

IFT—June in Boston

Time and place of the Institute of Food Technologists' 13th annual meeting have now been set—June 21-25, Hotel Statler, Boston. And final program plans are taking shape.

Slated for opening day are committee meetings and also set-up of an extensive exhibit of supplies, ingredients, and equipment. Then the general session will be called to order the second day, when top attention will be given practical perspectives of the food industry's future, with special reference to provision of proper foods for the growing elderly portion of the population.

Fermented products (pickles, kraut, and the like), chemicals in foods, and fish and fishery products will be third-day subjects. And fourth-day sessions

Injury Rate Down 2% in Safety Council's Check

A decrease of 2 percent from the '51 rate of injuries was chalked up in the 1952 Food Section Safety Contest conducted by the National Safety Council, Chicago.

Total number of accidents was put at 5,472, a rise of 4 percent. But this was more than offset by a 7 percent increase in man-hours to 456,730,000. Of the 725 entrants completing the contest, 154 won awards for ending the year with perfect records.

Accompanying table summarizes the 1952 contest by divisions, with latest month readings (December) given in the first two columns.

Food Section Safety Contest, 1952

Division	Dec. Freq. Rate	% Change From Nov.	1952 Freq. Rate	% Change From '51
I—Grain handling, processing	9.38	—18	10.03	+6
II—Prepared foods	7.48	—1	7.80	—11
III—Dairy products	11.43	—4	12.71	—8
IV—Preserved & canned foods	14.09	+37	14.48	—6
V—Fluid milk	17.82	—26	19.69	—2
VI—Tobacco	1.03	—67	2.73	—20
VII—Distilleries	5.29	+130	4.26	—14
VIII—Breweries	8.08	+60	13.03	—9
Entire contest	10.89	—5	11.98	—2

". . . After putting in the secret ingredient, vitamins, special weight-reducing factor, and body-building minerals, there's no room left for the product!"

will concern canning and processing, also specific vegetable and fruit subjects.

The 4th biennial Food Engineering Award, the Appert Award, and the Babcock Award will be conferred in special-honor sessions.

New Nickel Plating Uses Less Metal

A non-porous nickel plating of predictable thickness on almost any solid substance is reported possible with use of a new plating process.

Developed by General American Transportation Corp., Chicago, and named "Kanigen," it requires no electrolytic equipment.

Process is reported so manageable that intricate valves and other products previously impossible to plate successfully can now be covered thoroughly . . . Parts subject to great wear may be continuously coated and hardened beyond capacity of parent metal . . . Over-machined parts may be brought back to proper tolerance . . . And parts previously made of corrosion-resistant materials can now be made of cast steel and plated to a thickness of 3 mils.

It is said the technique can plate any article uniformly regardless of size or shape, with proof of satisfaction in production line plating of steel, copper, brass, bronze, stainless steel, and aluminum. Tests on plastics and magnesium indicated that these materials will also prove practical for Kanigen plating.

According to estimations, equivalent plate protection can be achieved with one-third to one-half the nickel formerly required. Thickness at present can be controlled within 1/10,000 in.

Claimed for new process: Throwing power, 100 percent; uniformity of coating; good adhesion (plated-steel test specimens pulled to breaking

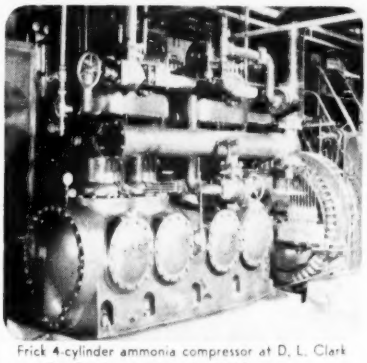
FAMOUS PITTSBURGH FIRM uses FRICK Refrigeration 35 Years, and finds it very dependable

The D. L. Clark Company, manufacturers of the world famous Clark Bar, and Clark Brothers Chewing Gum Company now operate eight large Frick refrigerating Machines in their Pittsburgh Plants. The first of these compressors, installed in 1918, is still in service. Other Frick equipment includes condensers, coolers, and controls.

Today, Clark Bars and Clark's Teaberry Gum are famous the world over. Frick air conditioning and cold storage systems play a vital part in maintaining the quality of all Clark products.

There's hardly a business that cannot profit from the use of similar Frick cooling equipment.

Let us quote on the system YOU need.



Frick 4-cylinder ammonia compressor at D. L. Clark Co., Pittsburgh. Motor has 300 horsepower.

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WAYNESBORO, PENNA. U.S.A.
Also Builders of Power Farming and Sawmill Machinery

MAXIMUM Service • MINIMUM Servicing

LA PORTE FLEXIBLE STEEL CONVEYOR BELTING

Here's "plus-performance" equipment that steps up food handling efficiency right down the line—from hopper to shipping room. It's adaptable to every process. And rugged LaPorte Flexible Steel Conveyor Belting requires *less maintenance*, which means faster processing . . . greater profits for you.

LaPorte ***FLEXIBILITY*** eliminates creeping, weaving or jumping by allowing a tighter grip of belt on friction drum. Insures perfectly flat surface for containers, empty or filled. STEEL MESH CONSTRUCTION withstands heaviest loading impacts. This open mesh also provides for greater circulation of air and liquids around products in process . . . facilitates cleaning. Highly resistant to heat and cold. Choose LaPorte for dependable, "plus" service for years to come.

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heart of the strainer

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OTHER REASONS—

- cadmium plated bodies and screen caps
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- ten sizes from 1/4" to 3"

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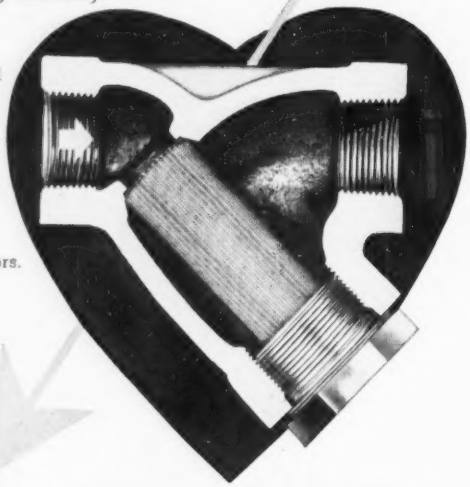

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The Virginia Bonded Warehouse and Transportation Company, operated by Lehigh, offers you facilities comparable with having your own warehouse in the area without the costs and bother of ownership.

Total space: 160,000 square feet, 8-car siding on Southern Railway, 8-truck platform. Sprinkler protected, ADT watchman controlled; U.S. Customs bonded. Lehigh distribution services include modern materials handling, processing, repacking, local spot truck delivery, car pool handling.

Here is a complete storage and spot delivery service to help you sell more in Virginia and *keep delivery promises*. You have no worries about payrolls, overhead, unprofitable bookkeeping . . . pay only for space and services used.

Let Lehigh take over your storage and distribution in this important southern area. It will cut your selling costs!

Lehigh Lackawanna

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point in tensile strength machine showed no flaking or chipping of plating); good corrosion resistance; virtually no porosity; hardness range, 550-566 Vickers; ductility, very low; electrical resistance, approx. 60 microhms per cm.

Reefers to Carry Loads In Cool Air "Envelope"

Enclosure of loads in a complete "envelope" of cold air is enabled by special construction in 25 new mechanically refrigerated "super-giant" freight cars. Pacific Fruit Express Co. is turning them out at its Roseville, Calif., shops.

The plywood car-lining is spaced away from the insulated walls in the new design, thus providing an air flue that communicates with similar air spaces over the metallic ceiling and under the floor.

With separation of the refrigerated air circulation in the envelope thus formed, blasts of freezing air no longer will discomfit workers during loading.

Car ceilings will carry 10½ in. of insulation, walls 6 in., and floor 7 in. Other features: 6-ft. doors, easy riding trucks, and rubber draft gear.

Soft X-Ray Sterilization

Effectiveness of soft X-rays in sterilizing a canned powdered-milk product (Similac) without important injury to the product has been demonstrated at Battelle Memorial Institute, Columbus, Ohio.

Rays produced at kilovoltages of 50-60 kvp. were employed in the tests, which were conducted for M & R Dietetic Laboratories, Inc., of Columbus. The rays are termed "soft" up to 150 kvp.

Several advantages are cited for the technique. Cost per unit of production treated is seen as low. The equipment is reported to be relatively inexpensive, rugged, simply maintained, and readily fitted into small space. Further, it could be nearly automatic, and no trained X-ray operator would be needed. Also, shielding to eliminate hazards to personnel would be easy due to the rays' lower penetrating power.

Peanut Studies Drafted

Specific new research on peanuts, aimed toward attaining economic stability in the field, was drafted during the recent conference at Southern Regional Research Laboratory, New Orleans.

Need for better growing and harvest-

(Turn to page 247)

DEPENDABLE COLORS
for Discriminating Buyers

- Unlimited production facilities
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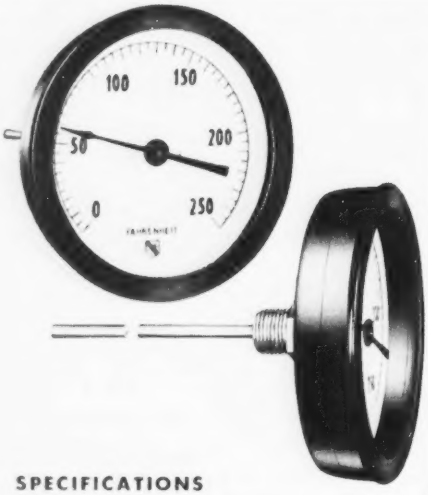

SPECIFICATIONS

Temperature Ranges: From minus 60° to 1000° F.

Dial Sizes: 3½" and 5". Graduations over full 270° arc.

Case: Aluminum alloy with smooth, black enamel instrument finish.

Bezel: Screwed to case.

Front: Heavy plate glass set in channeled gasket — hermetically seals the case.

Pointer: Adjustable type attached with set screw; easy to get at for setting.

Connection: Fixed, ½" N.P.T.

Separable Sockets: Available for use in closed systems or where the measured medium is corrosive to the stainless steel stem. Fit over all standard stem lengths except 2½".

Accurate AMERICAN BI-METAL DIAL THERMOMETER

Accurate "on the spot" temperature readings are easy — *even from a distance* — when you use the American Bi-Metal Dial Thermometer. Installations in refineries, chemical and other process plants, and power stations have proved it ideal for locations where other types would not be nearly so practical. Furthermore, the cost is low compared to that of a distant reading thermometer.

Aside from precision manufacture and guaranteed accuracy within 1% of the scale range, the American Bi-Metal Dial Thermometer gives you these outstanding construction features:

POINTER "FLUTTER" PREVENTED by the use of a dampening fluid in the fixed stem which also houses the highly sensitive bi-metal element.

STAINLESS STEEL STEM WELDED AT BOTH ENDS. Prevents processing media from entering the case. Corrosion-resistant — helps prolong the life of the instrument.

CASE HERMETICALLY SEALED. In extensive laboratory and field tests, submersion, hot blasts, severe mechanical and thermal shocks, dust, hot gases and long exposure to the elements could not impair the accuracy of this rugged thermometer or destroy the hermetic seal.

For the best solution to your "on the spot" temperature reading problems, choose accurate American Bi-Metal Dial Thermometers. Installation is easy, fast and economical — only a ½" or ¾" N.P.T. tapped hole is required. Bulletin 144 contains complete details.

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MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'HANCOCK' VALVES, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, BUILDERS OF "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

From Sea to Box

Packing at sea is an efficiency feature of Kingfisher Trawling Co.'s rock-lobster-tail operation carried on at Lancelin, West Australia, which last year shipped 2,750,000 lb. of tasty tails to U. S. Product is cleaned, inspected, wrapped in cellophane, placed in 25-lb. softwood boxes, marked for color, count, grade, and weight, then put in quick freezers aboard boat. Brought to 20 deg. F. in a few hours, they finally go in holding chambers that further reef them to 5 F. The profitable operations, just sprung up in the last two years, are rounded out by two other processing plants ashore—Paterson & Co. and Lancelin Products. Overseas shipping is via Fremantle.

ing methods making possible a higher-quality, better-flavor nut for processors was accented in the study recommendations adopted.

Research to reduce shriveled nuts, also to get data helping toward production of a variety having uniform moisture content, was ranged by the peanut butter makers. Meanwhile, salting processors projected studies to improve blanching and deep-fat frying operations.

Further targets: Increased use of peanuts as oilseeds, also better utilization of the nuts in making byproducts, with emphasis on use of kernels undesirable for edible products.

GF Boosts Study Aid

Extension of its research fellowship and grants-in-aid program is announced by General Foods Corp. Studies aided by the fund increase include "cold" sterilization of foods, spray drying engineering, agricultural trace elements, and structural design of cartons. Recipients are Massachusetts Institute of Technology, Institute of Paper Chemistry, the universities of New Hampshire and Wisconsin, and Iowa State College.

Fast, Automatic Shower Bath for Carrots

● Where carrots are produced and marketed in huge volume, growers have developed an automatic bath-spray washer unit. Carrots are spread on a Cyclone Equalized Flat Wire or Spiral Woven Belt and carried first through a tank of water, then under automatic sprays. As carrots reach the end of spray unit, skilled workers—on either side of the belt—rapidly gather and pack them.

The variety of food processing operations which can be improved, or speeded up with Cyclone Conveyor Belts is almost unlimited. Call on our experienced engineers. Without obligation they'll be glad to tell you how you can best use a Cyclone Conveyor Belt in your food plant. And write Dept. H-43 for Catalog #4.

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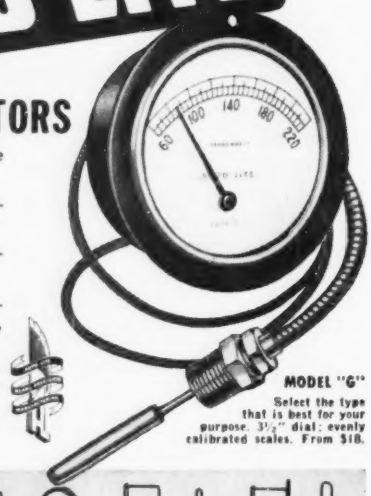

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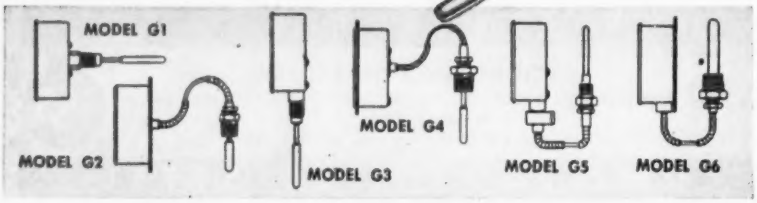
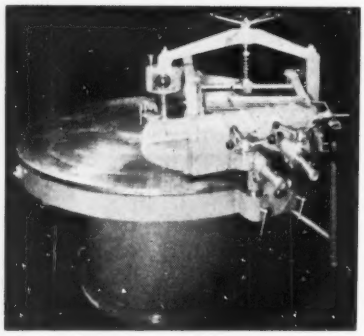


C & M
AUTOMATIC
BATCH KNEADER
AND MIXER
FOR QUICKER MIXING
MORE RAPID COOLING



Here's the machine that will save you much time and labor in kneading and mixing batches—the C&M Automatic Batch Kneader and Mixer.

After the candy has left the vacuum cooker or cooking kettle and the flavor and color have been added, it is placed on the C&M Automatic Batch Kneader and Mixer. Here, any batch from 30 to 125 pounds is thoroughly kneaded and mixed *automatically*. At the same time, the water-cooled rotary table and kneading roller cool the batch more rapidly. It only takes from 1½ to 3 minutes for a completed batch.

Built for heavy duty operation, the C&M Automatic Batch Kneader and Mixer is simple to operate. One operator, without experience, can operate it to its full capacity.

Write today for complete information.

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Schedue of Events

April

11–15—National Fisheries Institute Annual Convention; Shoreham Hotel, Washington, D. C.
18–19—Packaging Machinery Manufacturers Institute; Sheraton Hotel, Chicago.
19–22—United States Wholesale Grocers' Assn. Convention & Exposition; New Orleans.
20–23—Frozen Food Industries Exposition; Grand Central Palace, New York City.
23–25—Southern Bakers Assn. annual meeting; Vinoy Park Hotel, St. Petersburg, Fla.

May

4–6—American Oil Chemists' Society annual meeting; Roosevelt Hotel, New Orleans.
11–13—Millers' National Federation; Edgewater Beach Hotel, Chicago.
18–21—Assn. of Operative Millers; Hotel Nicollet, Minneapolis.
18–22—Materials Handling Exposition; Convention Hall, Philadelphia.
24–28—American Assn. of Cereal Chemists annual convention; Hotel Statler, Buffalo, N. Y.

June

14–18—National Confectioners' Assn. annual convention, and (16-18) Confectionery Industries Exposition; Waldorf-Astoria Hotel, New York City.
15–19—Exposition of Basic Materials for Industry; Grand Central Palace, New York City.
21–25—Institute of Food Technologists annual meeting and FE Award; Hotel Statler, Boston.
22–26—2nd. International Congress on Food Distribution; Ostend Kursaal, Ostend, Belgium.
22–26—13th International Dairy Conference, The Hague, Netherlands.
23–25—National Macaroni Manufacturers Assn.; Hotel Broadmoor, Colorado Springs, Colo.

Cl Dips Improve Poultry

Increased shelf-life of chilled poultry following chlorine dips was reported by Dr. M. Wayne Miller, of the Washington Cooperative Farmers Assn., in a talk at the recent Institute of American Poultry Industries' Fact Finding Conference.

Prior to cooling in ice water and cutting up, birds were dipped for 30 sec. in water containing 1,000 ppm. of free chlorine. Then they were stored at 33 deg. F. for two weeks, and it was found that they had only about 1/4th the bacteria count of untreated birds. Further, their odor and appearance were satisfactory, whereas the control poultry was by that time badly soured.

At the end of 18 days, the dipped fowl showed slight off-odors, while the control birds were decomposed.

USDA Grade Standards

Recent actions by Production & Marketing Administration of USDA on U. S. Grade Standards and related activities include the following:

Canned Carrots, third revision, p. 1105, Feb. 26 *Federal Register*, effective Mar. 28.

Frozen diced carrots, revised, p. 1108, Feb. 26 *Federal Register*, effective Mar. 28.

Frozen squash (summer type), new, p. 1182, Mar. 3 *Federal Register*, effective Apr. 2.

Canned mushrooms, second revision, correction, p. 1182, Mar. 3 *Federal Register* (change involving subparagraph "i" under tolerance for certification of officially drawn samples, from which a few lines had been omitted in first printing, p. 11428, Dec. 18 *Federal Register*).

FDA Food Standards

Status of food standards of the Food & Drug Administration had changed little at mid-March. No hearings were in progress, and no new standards were completed. But several hearings are scheduled, and tentative and final orders are awaited. These are listed below:

Future Hearings: *Salad dressing*, rehearing, standard of identity; "skim milk and milk products" proposed as optional ingredients. FDA gathering data; no hearing date set yet.

Process cheese food, amendment, standard of identity; skim milk cheese proposed as optional ingredient. Hearing expected soon, but date not set.

Canned tuna, new, standards of identity and fill. Hearing expected soon, but no date set; initiative of Administrator.

Canned salmon, new, standards of identity and fill. Field work by FDA still in progress; no hearing date set; initiative of Administrator.

Canned sardines, new, standard of identity. Field work by FDA still in progress; no hearing date set; initiative of Administrator.

Frozen vegetables, new, probably only peas and asparagus at first. Hearing expected late this year; initiative of Administrator.

Beverages, new, both still and carbonated. Preliminary information being gathered by FDA, but no hearing date set; initiative of Administrator.

Tentative Orders Awaited: *Residue tolerances*, on fresh fruits and vegetables, new. Expected soon; hearing adjourned Sept. 1950; briefs filed Dec. 1950.

Canned pineapple and canned pineapple juice, new, standards of identity, quality, and fill. Expected in early 1953; hearing adjourned in Apr. 1952; briefs filed in September.

Ice cream, new, standard of identity. Not expected soon; hearing adjourned

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MORE and more Food Product Processors are depending upon us for Food Starches and Thickening Agents. Direct importers and manufacturers, we can ship quickly and economically in any quantities from a few 100 pound paper bags to many carloads. MORNINGSTAR Products are scientifically prepared and laboratory controlled to precise standards of *uniform* fine quality. They'll add new appeal to many foods. MORNINGSTAR, NICOL, INC., 640 West 51st Street, New York 19, New York; 1780 Canalport Avenue, Chicago 16, Illinois.

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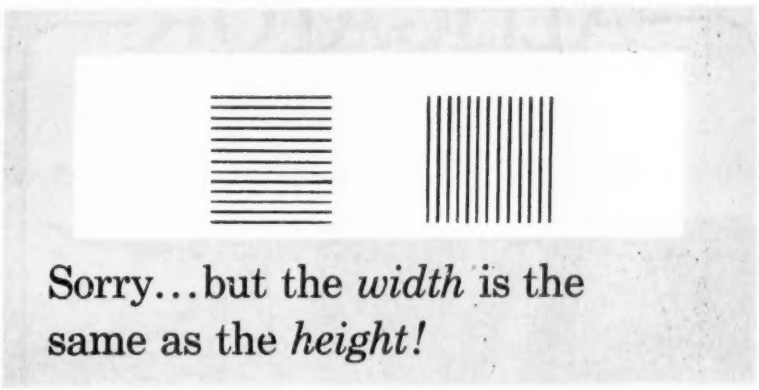

Sorry...but the *width* is the same as the *height!*

Things don't always turn out to be *the way they appear.* Realizing this, leading food processors *test* with COOK-CHEX quality control tags.

And unless the purple spot on the tag has changed to green, they *know* that bacteria aren't completely destroyed. Write today for a free supply of COOK-CHEX, stating the time and temperature of your processes.

See for yourself how COOK-CHEX save time, save money, and insure your good name with consumers by eliminating the possibility of flat sours and blown cans.

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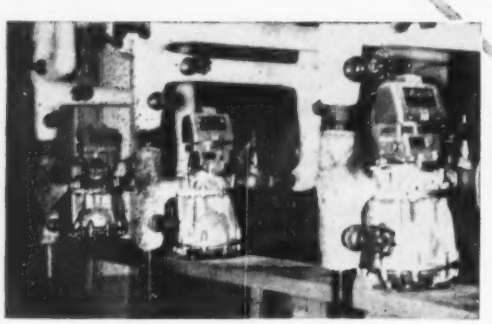

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There's no guesswork and practically no chance for human error when Bowser Xacto meters are used . . . delivery quantity can be predetermined . . . and then automatically shut off when completed.

Wherever extreme accuracy is an important requirement in the measurement or batching of liquid food ingredients . . . you'll find that Xacto meter can do the job easier and more accurately than you are now doing.

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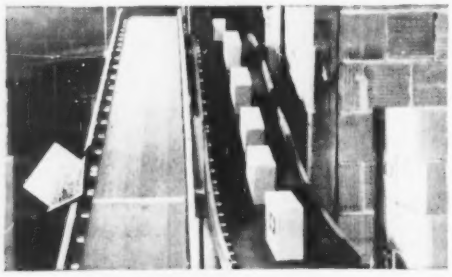

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★ Excellent for Package Conveyors, Portable Loaders, Trenching and Ditching Machines, etc.
★ In canneries where corrosion or rust is a problem specify Alligator made of Stainless or Monel.
★ For magnetic separators or anti-sparking specify Alligator made of Everdur.
★ Separable and smooth on both sides.
★ 12 sizes. For belts from 1/16" to 5/8" thick—and *any width.*

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FLEXIBLE STEEL LACING CO., 4646 Lexington St., Chicago 44, Ill.

JUST A HAMMER TO APPLY IT

in December, briefs due on May 5.

Final Order Awaited: *Frozen fruits*, new, standards of identity and fill. Still expected very soon; tentative order published in Oct. 1950; exceptions filed in Jan. 1951.

Court Actions Pending. A *Supreme Court* answer was awaited on two petitions for writ of certiorari to review the bread standard decision of the Third Circuit Court of Appeals. These petitions were filed by Glyco Products Co. and Atlas Powder Co.

The Government's brief in opposition to these petitions was due to be filed with the Supreme Court on Mar. 19. If the Supreme Court agrees to hear the cases, argument may be possible before the summer recess, but a decision before the fall term seems unlikely.

Eighth Circuit Court of Appeals also has a bread standard case on its docket, filed by Research Products Co. of Kansas City. Argument is not yet scheduled but probably will take place during the spring.

Second Circuit Court of Appeals will probably hear oral arguments in April on a margarine standard case brought by Richard S. Reade of New York City.

Antibiotics Hazardous: Addition of antibiotic drugs to foods for human consumption, either direct or indirect, has been termed by FDA as "a public health hazard." Consumption of food so treated "may cause sensitization of the consumer to such antibiotics and may result in the emergence of strains of pathogenic microorganisms resistant to these drugs."

Either the presence of such drugs in foods, or their addition to foods, "may be deemed an adulteration" under Sec. 402 of the FDC Act, according to Mrs. Hobby, Federal Security Administrator, in a Feb. 18 policy statement (p. 1077, Feb. 25 *Federal Register*).

—*End*—

Lug Boxes Roboted

—*Continued from page 65*

One converter can be used with several scales to give a continuous check on processes. It provides an automatic means for continuously printing a record of what comes in and what goes out at each stage of a process.

Automatic Materials Handling

As for the Calavo unstacker, the major characteristic distinguishing it from other units of this kind is that it deals boxes from the bottom of the stack—not the top.

Four vertical cylindrical rollers, two

on each side of the unit, position the stacks of boxes properly as they enter the unit. As one stack comes in, it strikes a limit switch which stops the floor chain-conveyor feed-in. The two belt conveyors are filled, up to and including the dumper with five boxes.

There is a short chain conveyor directly in front of the dumper. The first box is stopped in proper position on this chain by a gate. The second box is stopped from moving onto the dumper chain by two dogs which automatically project from each side of the conveyor. The two arms of the dumper-clamps rest below and on both sides of this conveyor, and when in operation they rise and clamp the bottom of the box. Simultaneously, a padded cover swings over the top of the box.

The clamps now turn the box in a 180-deg. arc, at which time the padded cover is tripped open and fruit rolls down it gently onto the scale conveyor belt.

This belt is stationary when the fruit rolls on it. But after the weight reading has been automatically taken, a relay switch starts its motor and the fruit is conveyed to the main conveyor leading into the washer-waxer.

The empty box is returned to the dumper chain conveyor, the gate automatically drops, and the box moves from this conveyor onto the one leading to empty-box storage. Simultaneously, the dogs release the second box, which moves to the dumper, and the unstacker moves the sixth box onto the conveyor-elevator.

"Simplicity Itself"

To attain the most efficient arrangement for materials handling in this plant required unstacking from the bottom of stacks. At first glance, it would seem that this is doing it the hard way. However, the unit is simplicity itself.

It is powered by a ¾-hp. gear-head Sterling motor with a motor-mounted electric brake. The motor, running at 1,800 rpm., drives a sheave at 37 rpm. Attached to the sheave, on both sides, are crank arms with lifting bars. These two bars are connected to the two carriages which operate in vertical tracks on each side of the unit. Each of these carriages have a full-length dog operated by two cams.

When, during operation, the lifting bars reach the bottoms of their throw, or travel, a cam locks the dog in a closed vertical position and it disengages from the bottom box, allowing the box to move out of the unstacker.

Then as the carriage travels upward, a second cam releases the dog just as it reaches the top edge of the bottom box. It slides along this part of the box, then drops into the crevice between bottom and the next box up in the stack. As the crank-arms continue their revolution, the carriages lift this second box upward about 1½ in. so that it is completely clear of the bottom box.

Simultaneously, a secondary, short floor-chain conveyor is lifted to a point slightly higher than the main floor chain-conveyor. The chain begins moving, engages the box, and conveys it out of the machine onto the moving belt elevator conveyor.

When the bottom box has exited, the crank arm proceeds to lower the entire stack so that what was the second box now becomes the next box to exit from the unit.

The main floor chain-conveyor is driven by ½-hp. gear-head motor, sunk beside it in the concrete floor. The secondary chain conveyor is driven by chain drive from the elevator conveyor.

Capacity of the main floor conveyor is sufficient to handle seven stacks of boxes, eight high. One of these would be in the machine, another ready to enter it, and five remaining on the floor chain.

End (Resume reading on page 66)

VIP's (Very Important Processors)

Freeze with

Amerio CONTACT PLATE FREEZERS

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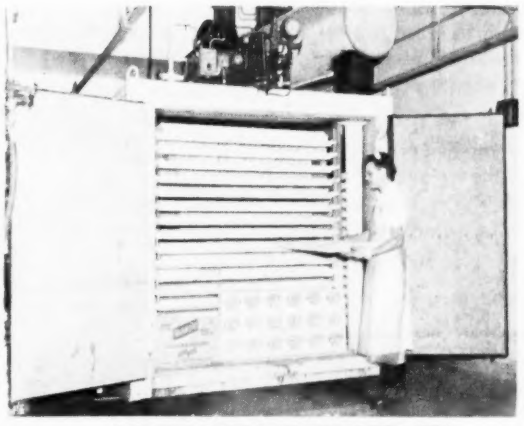
for Flavor Superiority



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the finer the product

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The faster the freeze the finer your product. Contact Plate Freezers by Amerio freeze at the same time from the top and from the bottom of your packaged product while under controlled hydraulic pressure.

Processor after Processor has found Amerio Freezers the way to bigger and better business and profits.

As your plant capacity is increased, with the "Amerio Unit Plan" you merely add Amerio Freezers, which are portable and so permit flexible arrangement of your processing line.

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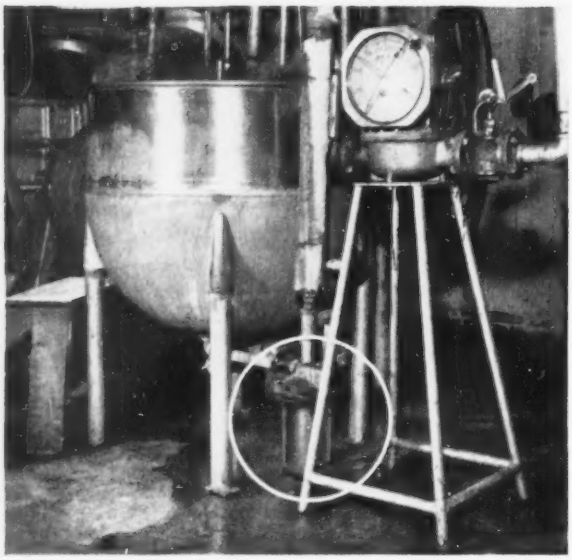
Cuts Kettle Cooking Time 40%!



QUEEN ANNE Candy Company finds how to get the most out of Steam Jacketed Kettles:

HERE is how Queen Anne Candy Company, Chicago, Ill., proved the best method of trapping a 1,000 lb. jacketed kettle for cooking sugar water and syrup (100 lb. steam pressure). They tried:

1. **An old Armstrong No. 2 trap from their storage room. Result—*75 to 80 minutes cooking time.***
2. **An Armstrong trap with thermic air vent in the bucket. Result—*60 minutes cooking time.***
3. **An Armstrong trap with *large vent*, sized as recommended in The Armstrong Steam Trap Book. Result—*only 45 minutes cooking time* and uniform kettle temperatures from top to bottom (between 330° and 338°F, or almost perfect correspondence with steam pressure).**

Armstrong tests have proved time and again that trapping jacketed kettles with Armstrong *large vent* traps gives the *fastest cooking*, faster even than steam-wasting cracked valves! For details call your local Armstrong Representative, or write: ARMSTRONG MACHINE WORKS, 866 Maple Street, Three Rivers, Michigan.

ARE STEAM TRAPS GOOD FOR JACKETED KETTLES?—
is the title of a new 4-page bulletin you will want. Free on request.

Recent Inventions

PRODUCTS

Ice Cream Mix Containing Modified Gelose Compound—*V. C. E. Le Gloahec, Rockland, Maine to* Algon Corp. of America, *New York. No. 2,624,677. Jan. 6, 1953.*

Bloom Inhibited Chocolate Containing Lipophilic Partial Fatty Acid Ester of Polyhydric Compound—*S. T. Cross, Elsmere, Del. to Atlas Powder Co., Wilmington, Del. No. 2,626,216. Jan. 20, 1953.*

Dry Butter Oil Produced by Melting Butter in Water, Agitating, Reducing Acidity, Heating, Filtering, Separating, Attemperating, Pasteurizing, Chilling—*I. J. Lundal and R. P. Robichaux, to Cherry-Burrell Corp., Chicago. No. 2,626,217. Jan. 20, 1953.*

Homogenous Liquid Pepper Made by Adding Anhydrous Normally Liquid Organic Acid to Pepper Oleoresin—*C. Johnstone, Brooklyn, N. Y. and F. R. Schumm, Jersey City, N. J. to Dodge & Olcott, Inc., New York. No. 2,626,218. Jan. 20, 1953.*

Dry Homogenous Food Composition Consisting of Soybean Flour and Hydrolized Vegetable Protein —*E. K. Pettibone, San Francisco. No. 2,627,462. Feb. 3, 1953.*

Stable Non-Hygroscopic Whey Powder Made by Concentrating to Slight Alpha Lactose Crystallization, Spray Drying, Separating Stabilized Fraction by Classification—*R. E. Meade, Appleton, Wis. to Western Condensing Co., San Francisco. No. 2,627,463. Feb. 3, 1953.*

Making Prepared Sprouted Wheat Cereal by Germinating, Drying, Grinding, Mixing With Water, Cooking, Canning—*K. Kehetian, Detroit. No. 2,627,464. Feb. 3, 1953.*

Skinless Frankfurter Produced by Stuffing Hydrolabile Plastic Tube, Smoking, Cooking Then Dissolving Casing—*J. L. Lewis, to J. L. Lewis, Baltimore, Md., S. Feinberg and B. H. Fogelson, Roselle, N. J. No. 2,627,466. Feb. 3, 1953.*

Hydrogenated and Winterized Soya Bean Salad Oil, With Small Amounts of Conjugated Dienoic, Trienoic, and Tetraenoic Acid Components—*C. M. Gooding, Staten Island, N. Y. to The Best Foods Inc., New York. No. 2,627,467. Feb. 3, 1953.*

Chewing Gum That Supplies Fluorine—*F. G. Merckel, Montclair, and L. Reiner, Bloomfield, N. J. to Wallace & Tiernan Products, Inc., Belleville, N. J. No. 2,627,493. Feb. 3, 1953.*

Egg Substitute in Dry Powder Form Consisting of Rice and Tapioca Starches Mixed With Powdered Skim Milk, Albumen, and Gas Forming Agent—*M. M. Healy, Flint, Michigan. No. 2,628,904. Feb. 17, 1953.*

PROCESSES

Method of Making Coiled Vermicelli and Like by Extrusion and Manipulation With Automatic Fingers—*F. S. Lombardi, North Hollywood, Calif. No. 2,621,615. Dec. 16, 1952.*

Applying Inedible Decoration to Edible Foods Having Tacky Surface Employing Absorbent Stencil and Powdered Material—*C. L. Sunkel, Baltimore, Md. No. 2,624,277. Jan. 6, 1953.*

Reducing Color Intensity in Malt Beverages by Adding Dihydroxyphenylalanine Decarboxylase to Wort—*J. S. Wallerstein, New York City, M. Hale, Brooklyn, R. T. Alba, Springfield Gardens, and H. B. Levy, Levittown, N. Y. to The Overly Biochemical Research Foundation, New York. No. 2,624,675. Jan. 6, 1953.*

Making Glacé or Candied Fruit by Contacting With Dye-Containing Aluminum Sulfate and Subsequent Treatment With Series of Progressively Heavier Concentration Sugar Syrups—*E. R. Mako, Cleveland, Ohio. No. 2,624,676. Jan. 6, 1953.*

Crisping Honey by Adding Vinegar, Fermenting, Heating, Cooling —*F. E. Hageman, Chico, Calif. No. 2,624,678. Jan. 6, 1953.*

Permanently Altering Lard's Normal Crystallization Habit by Heat Treatment in Presence of Crystal Modifying Catalyst of Polyvalent Metallic Type—*K. F. Mattil and F. A. Norris, to Swift & Co., Chicago. No's: 2,625,478-82. Jan. 13, 1953.*

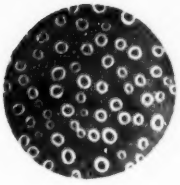
Treating Lard to Modify its Crystallizing Properties by Contacting With Various Alkali Metal Compounds to Produce X-Ray Diffraction Pattern Resembling Hydrogenated Vegetable Oil Shortening—*K. F. Mattil, W. E. Dominick, Chicago, and De W. Nelson, Elmhurst, Ill. to Swift & Co., No's: 2,625,483-87. Jan. 13, 1953.*

Preparing Coffee Beverage by Brewing Under Pressure, Cooling, Adding Diatomaceous Earth, Filtering, Adding Nordihydroguaiaretic Acid, Packaging in Hermetically Sealed Containers—*J. R. Stein, Beverly Hills, Calif. No. 2,626,558. Jan. 27, 1953.*

Peeling Rigid Vegetable Material By Forceful Impingement With Suspension of Water-Soluble Non-Toxic Crystallatine Material—*L. E. Treat, Wilmette, Ill. No. 2,626,646. Jan. 27, 1953.*

RIGHT IN YOUR OWN BACK YARD ... BY WEST
BUGS KNOW IT'S THE KISS OF DEATH WHEN THE WEST MAN TURNS ON THE NEW ATOMIZER
A TWIST OF THE WRIST AND IN TWO MINUTES THIS PLANT WILL LOOK LIKE A LONDON FOG!
WEST ATOMIZERS? WOW! WE'RE SITTING DUCKS IN THIS CRACK!
WOW! THIS JOB USED TO LOUSE UP THE WEEKEND FOR FIVE MEN. AT DOUBLE TIME!
YOU'LL STILL SWING A MOP, THUNDERFOOT. THIS IS A BUG KILLER, NOT A JANITOR!
BET THIS BLOWS MY JOB RIGHT OUT THE WINDOW!
TRAPPED BY VAPOSECTOR! SAME DIRTY TACTICS THAT WIPED OUT OUR COUSINS AT THE CANNERY!
JIGS UP! IT'S THIS OR WEST FUMIGANTS OR WEST RESIDUALS!
WHAT STRATEGY! THEY'VE MAPPED OUT AN INSECT CONTROL PLAN THAT'S STOPPED US COLD!
HEY! WAIT A MINUTE... WHO'S GONNA CARRY US OUT?

Fog 1,000 cu. ft. in 3 seconds for 5¢



Top — Magnified photo of uniform 8 micron droplets produced by precision-machined suction nozzles of West Atomizing equipment. "Dry mist" remains air-borne for prolonged periods.

Bottom—Magnified photo of droplets produced by ordinary hydraulic compressor sprayers. Vary from 2 to 300 microns. Larger droplets fall, wetting floors and reducing effectiveness.

— and with only 1 ounce of Vaposector — for complete control of flying insects. Double this dosage for crawling insects.

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Purifying Sugar From Inedible Molasses by Treating With Acid, Adsorbent Earth and Charcoal, Settling, Decanting, Filtering, Then Precipitating Na and Li Cations With Hydrofluosilicic Acid, Filtering, Liming, Heating, Subsequently Precipating Anions, Decolorizing, Passing Through Ion Exchange Cells to Produce Liquid Containing Vitamin B and Other Non-Sugar Solids—*J. P. Bartz, Fort Lauderdale, Fla. No. 2,626,878. Jan. 27, 1953.*

Inhibiting Gas Formation in Vacuum Packed Unprocessed Bacon by Prior Treatment With Gluconic Acid to Reduce pH to 4.5-5.2—*G. E. Brissey to Swift & Co., Chicago, Ill. No. 2,627,473. Feb. 3, 1953.*

Producing Layer Pastry From Elongated Dough Sheet by Continuous Buttering of Sheet on Belt and Winding Around Mandrel, Then Cutting and Baking—*L. O. Stiles, Seattle, Wash. No. 2,627,825. Feb. 10, 1953.*

Partially Inactivating Enzymes in Citrus Juices by Passage Through Heat Exchanger While Under Vacuum and at Velocity Below That of Turbulent Flow—*H. S. Madsen, Lakeland, Fla. to General Foods Corp., New York. No. 2-628,168. Feb. 10, 1953.*

Removing Husks and Silk From Ears of Green Corn by Cutting Ends and Blowing Compressed Air From Both Ends—*J. P. Murdoch, Ardmore, Pa. No. 2,628,621. Feb. 17, 1953.*

Preventing Discoloration of Sliced and Peeled Fruits and Vegetables by Dipping in Sodium Bisulfite Solution Buffered to pH 5.2-6.5 With Edible Product, Drying—*L. L. Antle and R. M. Bohn to L. L. Antle & Co., Inc., Atlanta, Ga. No. 2,628,905. Feb. 17, 1953.*

EQUIPMENT

Machine for Dividing Ribbon of Dough Into Separate Portions—*C. D. Rice, Kalamazoo, Mich. No. 2,619,051. Nov. 25, 1952.*

Fruit Stemming Machine Employing Rotating Tunnel With Stem Collecting Structure and Rotating Pulling Rods—*W. E. Urschel, Valparaiso, Ind.; J. R. Urschel, Administrator. No. 2,621,690. Dec. 16, 1952.*

Machine for Cutting Pickles Into Elongated Strips by Forcing Through Cutting Tube With Radial Blades by Means of Motor Driven Rollers—*C. G. Lang to C. C. Lang & Son, Inc., Baltimore. No. 2,621,695. Dec. 16, 1952.*

Apparatus for Homogenizing Liquids Employing Elongated Magnetostriction Vibration Generator Surrounding Restricted Fluid Passage—*F. H. Daniell, East Malvern, Victoria, Australia to Kraft Walker Cheese Co. Proprietary Ltd., South Melbourne. No. 2,621,905. Dec. 16, 1952.*

Apparatus for Pitting Peaches Employing Gripping Members Which Retain Halves After Bisecting and Move Them to Zone of Action—*W. A. Kingsbury, Oakland, Calif. to Special Equipment Co., Portland Ore. No. 2,622,002. Dec. 16, 1952.*

Portable Pneumatic Grain Conveyor and Drier Employing Suction Pipe Feeding Heating Chamber Separator—*J. F. Finnegan, La Salle, Ill. No. 2,622,341. Dec. 23, 1952.*

Apparatus for Loading and Unloading Canning Retorts Employing Series of Superimposed, Vertically Spaced Horizontal Can Supporting Disks Movable Upon Upright Shaft Extending Into Retort—*F. J. Bott, Ogden, Utah to Berlin Chapman Co., Berlin, Wis. No. 2,622,747. Dec. 23, 1952.*

Apparatus for Treating Chocolate Pastes Employing Both Side Wall and Bottom Scrapers to Cover Product-Contact Area of Retaining Vessel—*A. Simon, Namur, Belgium. No. 2,622,856. Dec. 23, 1952.*

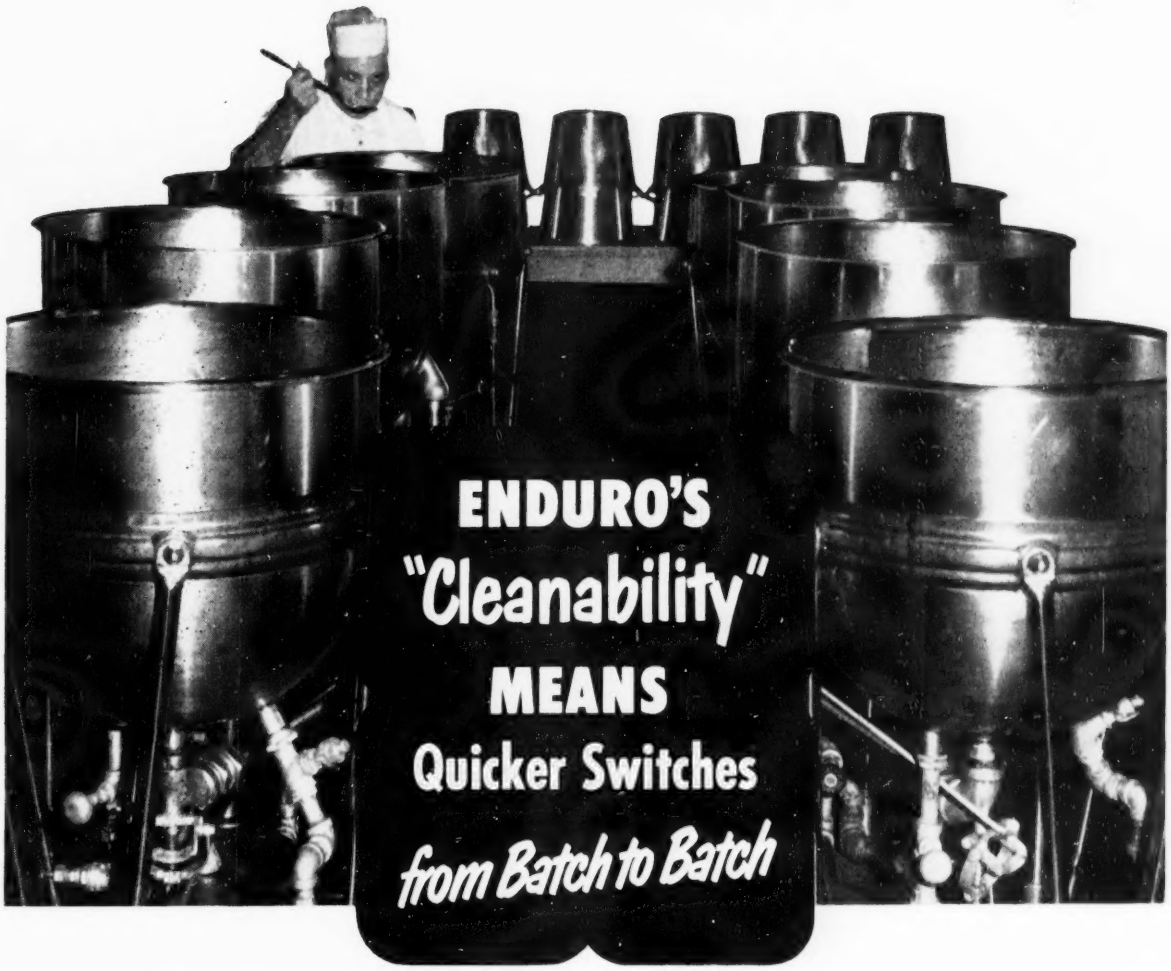
Machine for Automatically Removing Tie-Strings From Links in Chain of Frankfurters and Like—*H. E. Schaller, Lexington, Mass. to John E. Smith's Sons Co., Buffalo, N. Y. No. 2,623,237. Dec. 30, 1952.*

Batch Type Milk Pasteurizer Utilizing Electrical Water Heating Element With Automatic Temperature, Time, Cooling Control—*E. W. Losee to Losee Products Co., Hebron, Ill. No. 2,623,449. Dec. 30, 1952.*

Sausage Stuffing Apparatus Employing Induction Heating Coils Around Emerging Stuffed Casing to Firm its Meat and Permit Subsequent Automatic Opening—*J. J. Prohaska, La Grange, Ill. to Swift & Co., Chicago. No. 2,623,451. Dec. 30, 1952.*

Machine for Rounding Pieces of Dough for Long Loaves Employing Turntable With Helically Wound Stationary Vertical Wall Above it, and Rotating, Cooperating Cylindrical Brush—*H. Verheij to N. V. H. Verheij's Machines, Rotterdam, Netherlands. No. 2,623,478. Dec. 30, 1952.*

Dryer Utilizing Oscillating Rotating Drum With Openings for



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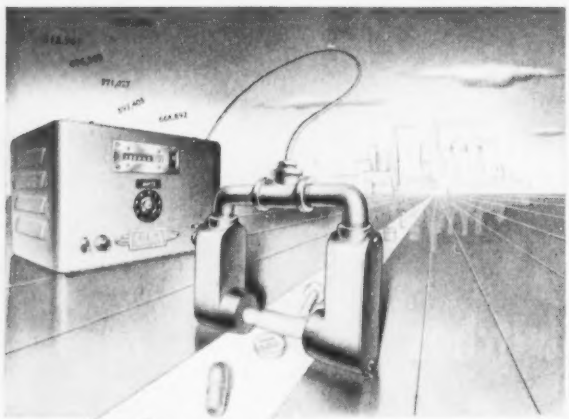

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Transmission of Hot Drying Gases Through its Peripheral Wall—*H. F. Irving* to *Baker Perkins, Inc., Saginaw, Mich.* No. 2,624,124. Jan. 6, 1953.

PACKAGING

Apparatus for Wrapping and Securing Bag Blank Around Product in Multi-Ply Tubular Form—*H. G. Allen, Niagara Falls, N. Y.* to *Savannah Sugar Refining Co., Savannah, Ga.* No. 2,624,990. Jan. 13, 1953.

Frankfurter Wrapping Machine Utilizing Scale-Suspended Well for Product and Pivotally-Mounted Heat Sealer—*T. J. C. Chapman and B. S. Jenison, Chicago, H. G. Holtz, Oak Lawn, Ill.* to *Swift & Co., Chicago.* No. 2,624,991. Jan. 13, 1953.

Automatic Carton Closing Machine—*B. S. Harrington* to *Armour and Co., Chicago.* No. 2,627,152. Feb. 3, 1953.

Device for Orienting Cans Employing Single File Moving Track and Pivotally Mounted Gate as Feeler Mechanism—*A. A. Yates, Redondo Beach, Calif.* No. 2,627,345. Feb. 3, 1953.

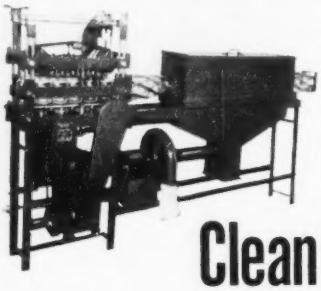
Device for Selectively Discharging Filled Cans According to Weight Employing Vertically Depressed Scale Platform and Multi-Level Rotatable Discharge Turret—*G. M. Stone, Westfield, N. J.* to *American Can Co., New York.* Nos. 2,627,346, 2,627,348. Feb. 3, 1953.

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Packaging Structure for Link Type Sausages Which are Individually Banded and Connected Side-By-Side in Straight Row—*O. E. Seiferth, Chicago* to *Voss Brothers Mfg. Co., Davenport, Ia.* No. 2,627,470. Feb. 3, 1953.

Stretchable Moisture- and Vapor-Resistant Packaging Material Composed of Regenerated Cellulose Tube With Bonded Coating of Dry Oil Fatty Acid Esters and Paraffin Wax—*L. E. Dowd* to *Transparent Package Co., Chicago.* No. 2,627,471. Feb. 3, 1953.

Method of Packaging Material by Placing in Aligned and Traveling Holders, Cutting, Sliding Product From Holders Into Containers in Series of Progressively Offset Stations—*A. C. Gannon, Indianapolis, and C. E. Kilby, Knightstown, Ind.* to *Kingan & Co., Inc., Indianapolis.* No. 2,628,758. Feb. 17, 1953.



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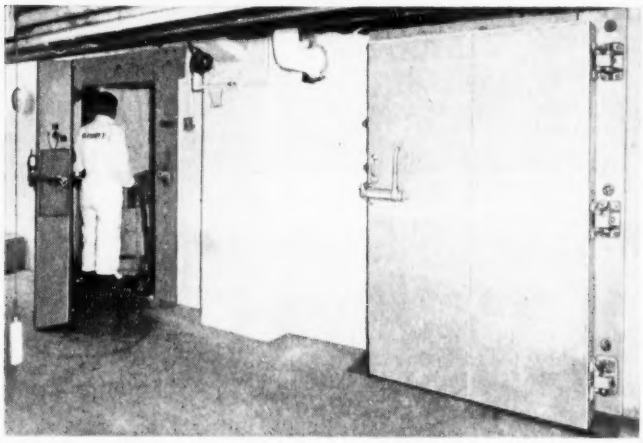
JAMISON doors really hold up under hard usage

— reports Hershey Creamery Co.

The Hershey Creamery plant in Harrisburg, Pa., produces over 32,500,000 pint packages of ice cream a year—the world's largest producer in this size. Cold storage rooms in the plant get hard daily use. The plant superintendent, H. E. Sauers, in commenting on storage room traffic said: *"We are well pleased with the way the Jamison Doors stand up under the extreme usage they get in our plant."*



PACKAGE STORAGE ROOM. Jamison Metal Clad Super Freezer Doors maintain a tight seal at all times in these 25° below zero rooms. Positive seal makes refrigeration more efficient by preventing frost from accumulating on refrigeration coils. Thickness of insulation in doors equals that of walls.

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FRUIT STORAGE ROOM. A Jamison Standard Door is used for this room storing fruits and flavors of all types. Temperature of room is held to 40° above zero. Completely metal clad doors insure maximum sanitation and simplify cleaning operations.

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ERIEZ Grate Magnets are available in 162 sizes, from 2½"x4" to 36½"x36". Here's protection to valuable equipment and a great help in preventing product contamination. Stops fires and explosions . . . *tramp iron can't get by!*

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ADAPTABLE FOR INSTANT INSTALLATION IN MOST ANY SIZE SLOPE-SHAPED HOPPER!

The new ERIEZ Hopper Magnet affords needed protection never before available! Circle design of the unit makes it the simplest of all magnetic installations . . . merely lay it in the throat of any hopper, and while in this position it will grab and hold tramp iron from the free flowing material which passes through it! Constructed in 1" increments, the units can be had in any width.

Send for free bulletin B-204 fully describing these two new magnetic products.

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Men & Companies

John M. Fox, president of Minute Maid Corp., has been elected to board of Morton Packing Co., Louisville, Ky., packer of frozen meat pies.

Nathan Lebowitz is new chairman of Borden Co.'s southeast ice cream district. He will oversee operations in five states.

Industry

Adams Brands Ltd. plans construction of new plant in Toronto to manufacture confectionery and chewing gum.

Anheuser-Busch, Inc. is erecting a new 41,600 sq. ft. warehouse at its Newark plant.

Bakery Foods Foundation, new Canadian nutrition information center, will spread new bread enrichment plan calling for addition of three vitamins and a mineral.

Borden Co. announces its plans to discontinue packing and distribution of brand frozen foods.

Cola-Cola Bottling, Inc., Spokane, Wash., is now in its new $250,000 plant.

Dr. Pepper Co. is building an ultra-modern $300,000 bottling plant in St. Louis, the company's first northern venture.

Exchange Lemon Products Co. announces an $872,000 improvement plan for its Corona, Calif., plant.

Falstaff Brewing Co., having purchased **Wieland's Brewery,** San Jose, Calif., for a reported $2,000,000, will spend over $5,000,000 to triple the plant capacity.

Fry-Cadbury Ltd., Montreal, has appointed J. E. Brian Greeves a vice-president and board chairman, and Joseph Russ as managing director.

General Baking Co. plans to build a $1,000,000 bakery at Spartanburg, S. C.

General Foods Corp. has acquired Perkins Products Co. It will continue production of Kool-Aid at the Perkins' plant.

Kemball, Bishop & Co. (Canada) Ltd. of Ontario, will begin initial production of citric acid in Canada.

Nu-Grape Bottling Co., Inc., Newton, N. C., has filed certificate of incorporation. Capitalization: $100,000.

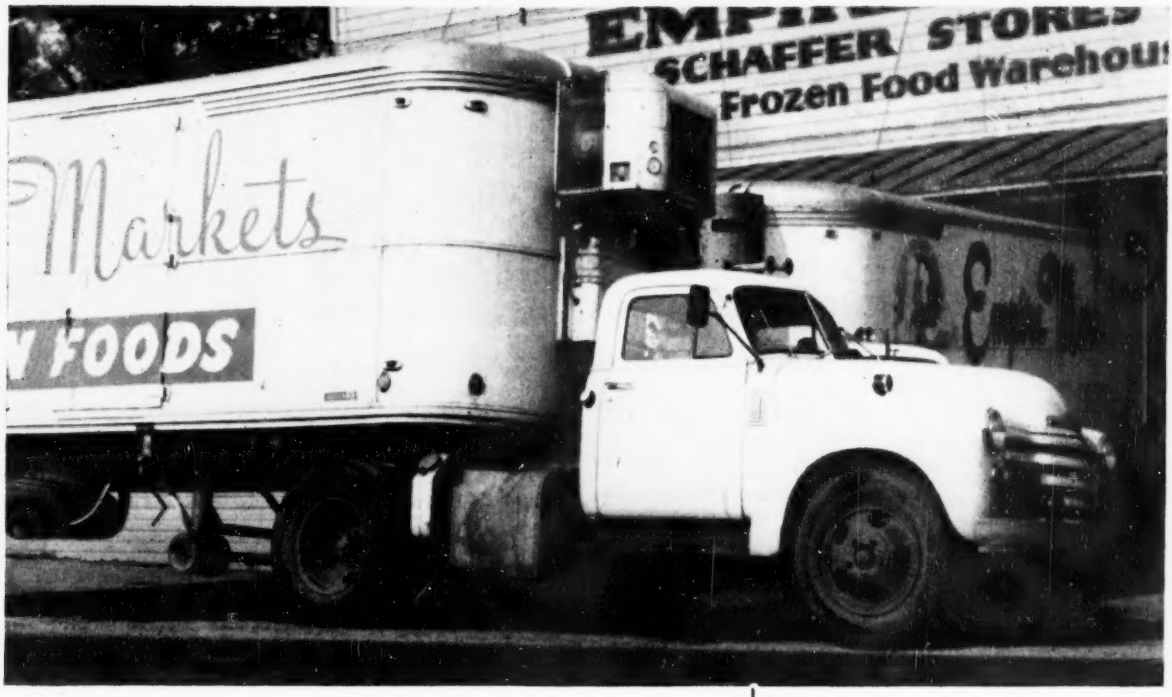
Old Dutch Foods, Inc., will expand its production at its Buffalo, N. Y., plant to include bottled fruit syrups.

Pet Milk Co. is erecting a $200,000 bottling plant at Washington, Ga.

Purity Bakeries Corp. and American Bakeries Co. (Chicago and Atlanta, respectively), plan a merger. It would bring total assets to $34,500,000.

Quaker Oats Co. has acquired a factory site in Colombia.

George F. Garnatz, director of Kroger Co.'s Food Foundation, has been named Cincinnati's "Engineer of the Year" for 1953. The Technical and Scientific Societies Council of Cincinnati makes the award.



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NEW ECONOMY—LOWERS COST OF EVERY TON-MILE HAULED! Expect greater economy with Chevrolet trucks. New and greater stamina with extra gasoline economy cuts operating costs, maintenance costs in heavy-duty models with Loadmaster engine. *And these great trucks list for less than comparable models of any other make!* Chevrolet Division of General Motors, Detroit 2, Mich.

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TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTI-PANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

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GENERAL BAKING COMPANY

¢ Makes Sense

When it comes to streamlined self-service merchandising. The incorporation of this handy, fill-in price spot has silently clinched many a speedy sale for Bond Stuffing Mix.

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Heat sealed to capture and retain all the flavorful, aromatic pungency of Bond's carefully guarded seasoning recipe. Peak flavor goodness is released only when consumer is ready to use.

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On reverse side beckon repeat sales. Costs no more production-wise and utilizes utmost goodwill potential of the package even after the product is in the housewife's cupboard.

At No Obligation Whatever

Paramount's expert Packaging Staff will be only too glad to analyze, comment and submit constructive pointers for increasing the effectiveness of your package requirements, also. Simply send a sample of your present package or note your problems.

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M. J. Swortfiguer of The Kroger Co., St. Louis, was elected '53-'54 president of American Society of Bakery Engineers at its annual meeting in Chicago. Elected as 1st, 2nd, and 3rd vice-presidents, respectively, were Wallace K. Swanson, Stroehmann Bros. Co., Williamsport, Pa., Elmer F. Glabe, Food Technology, Inc., Chicago, and Martin Eisenstaedt, American Stores Co., Philadelphia.

Louis Ratzesberger, Jr., president of Illinois Canning Co., Hoopeston, Ill., has been elected '53 president of National Canners Assn. Named vice-president by members gathered at the recent convention was E. E. Willkie, president of Pacific American Fisheries, Inc., Bellingham, Wash., president, and a director of Cedergreen Frozen Pack Corp., and a brother of the late Wendell Willkie.

Safeway Stores, Inc., Oakland, Calif., has purchased American Home Foods, Inc. and will begin operation in June.

Schlitz Brewing Co. will build a $250,000 warehouse in Miami.

Strietmann Biscuit Co., Cincinnati, division of United Biscuit Co., plans operation of a larger cracker and biscuit plant in Macon, Ga.

William Wrigley Jr. Co. will begin construction in June of a $3,000,000 chewing gum plant in Santa Cruz, Calif., to be completed in August 1954.

Personnel

James Amento has been named president and general manager of August Wagner Breweries, Inc.

N. L. Bosworth, board member of Canada Dry Ltd., has been elected vice-president and general sales manager of that company.

H. D. Buxton of California Frozen Foods, Inc., was elected president of Western Frozen Food Processors Assn. at the group's annual convention in February.

N. R. Clark, former vice-president of Swift & Co. has received the Institute of American Poultry Industries' first service award.

Henry G. Duvernoy, president of Duvernoy Bakeries, Inc., is chairman of New York Heart Fund's baking and confectionery division.

Max Freedman, president of Cook Coffee Co. of Cleveland, has been elected a vice-president of the American Jewish Committee.

Louis R. Gomberg has reopened offices as consultant on wine problems. He was formerly research director of the Wine Institute.

Dwight K. Grady has been elected board chairman of California Fig Institute.

Maryann Krecklow has been named assistant director and nutritionist of Dairy Council of Milwaukee.

Eugene H. McKay has accepted appointment as vice-president and general manager of Battle Creek Food Co., Battle Creek, Mich.

William B. Murphy, Campbell Soup Co.'s vice-president since

Winston A. Churchill has been appointed director of production and research by Andersen's Foods, Inc., Santa Barbara, Calif.

J. G. Brereton is recently appointed president of Sheffield Chemical Co., Inc., a subsidiary of National Dairy Products Corp. The new company will have its headquarters at Norwich, N. Y.

1949, has succeeded the company's retiring president James McGowan, Jr.

C. E. Nelson, vice-president in charge of processing of Kraft Foods Co., is new president of Ovson Co., subsidiary of National Dairy Products Corp.

Kenneth W. Pike has been named director of engineering and planning for Quaker Oats Co.

Fred Roberts, formerly with Tea Garden Products Co., will head Bagley Canning Co.'s new specialty department.

Conrad F. Sauer, III, has succeeded his father, the late C. F. Sauer, Jr., as president of C. F. Sauer Co.

Alfred N. Steele, president of Pepsi-Cola Co., was honored with a plaque at the fourth annual banquet of the Pepsi-Cola Distributors Assn.

Frank R. Taylor is new general manager of Canadian Sugar Factories Ltd., Alberta, Canada.

Irving Tenenblat of Monarch Provision Co. has been elected president of Chicago Meat Packers & Wholesalers Assn.

Walter D. Tiedeman has assumed duties as executive director of National Sanitation Foundation testing laboratory.

Associated Industries

Arthur Colton Co. announces appointment of Harold H. Simpson as laboratory director.

Barry-Wehmiller Machinery Co.'s board has elected Emil O. Birkner, vice-president of operations, as a director.

Chase Bag Co. announces appointment of Robert N. Conners as executive vice-president, and William N. Brock as general sales manager.

Continental Can Co.'s board of directors has elected Benjamin C. Betner, Jr., a vice-president.

Dodge & Olcott, Inc.'s new president is John L. Cassullo.

Givaudan Corp., New York City, has elected E. R. Durrer president of the company and its affiliates.

Timken Roller Bearing Co. announces appointment of Richard K. McConkey as assistant general manager of company's industrial division.

Westfield River Paper Co., Russell, Mass., and its subsidiary, Glassine Paper Co., West Conshohocken, Pa., have elected R. L. Cain to the board of directors.

Deaths

Fred Firmenich, 79, former head of Firmenich et Cie.—Jan. 5.

William Fries, 91, retired board chairman of California Packing Corp. and canning pioneer.—Feb. 20.

Frank H. Gordon, 74, former vice-president of Lukens Steel Co.—Feb. 10.

Mrs. Ethel Dorance, 75, an owner of Campbell Soup Co.—March 10.

Clifford L. Harrison, 52, member of Polak & Schwartz, Inc., flavor and essential oil makers.—Feb. 4.

Ralph D. Ward, 63, president of Drake Bakeries, Inc., New York, and vice-president of Borden Co.—Jan. 17.

James L. Kraft, 78, founder and chairman emeritus of the Kraft Foods Co. board, died Feb. 16, in Chicago. Noted as a pioneer in the cheese industry, he developed many basic production methods.

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Candy

with **Tenox** EASTMAN FOOD-GRADE ANTIOXIDANTS

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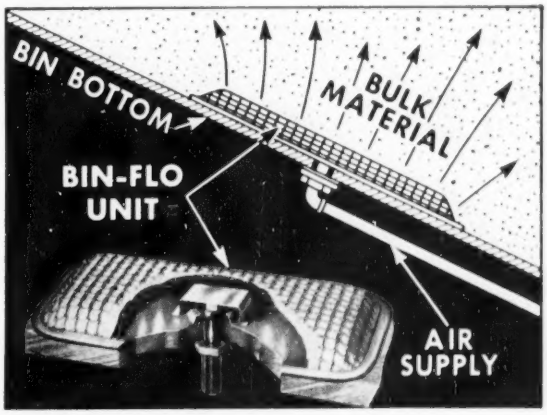

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It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

- No internal wearing parts.
- No valves, pistons, or vanes.
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- Desired delivery temperature automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

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Just Off the Press

New Catalogs and Bulletins
from manufacturers of equipment and supplies
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Food Plant Equipment

Tube Dryers

Bulletin 53 deals with line of steam tube dryers, stressing economy and efficiency. 18 pages.—*General American Transportation Corp., 135 South LaSalle St., Chicago 90.*

Circle 263A on Reader Service Card

Cleaning Systems

Use of central vacuum cleaning system in industry is featured in Bulletin D-5. 20 pages.—*Lamson Corp., Syracuse 1, N. Y.*

Circle 263B on Reader Service Card

Water Chiller

Bulletin offers photographs and dimensions of absorption-type water chiller. 8 pages.—*Servel, Inc., Air Conditioning Dept., Evansville 20, Ind.*

Circle 263C on Reader Service Card

Transformer Laminations

Drawings and technical data on transformer laminations are offered in Catalog EM3, along with weight tables. 124 pages.—*Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22.*

Circle 263D on Reader Service Card

Magnetic Starters

Folder describes magnetic motor starters.—*Arrow-Hart & Hegeman Electric Co., 103 Hawthorn St., Hartford 6, Conn.*

Circle 263E on Reader Service Card

Water Heaters

Capacity tables and photographs of water heaters heating water with steam, are presented in Bulletin EB-751. 22 pages.—*Bell & Gossett Co., Morton Grove, Ill.*

Circle 263F on Reader Service Card

Lightweight Pump

New self-priming centrifugal pump, weighing 55 lbs. is described in leaflet.—*Carver Pump Co., Muscatine, Iowa.*

Circle 263G on Reader Service Card

Mechanical Separators

Use of purifiers in cleaning up moisture, mist, and dirt in pipelines and equipment is explained in Bulletin 700. 8 pages.—*V. D. Anderson Co., 1935 W. 96th St., Cleveland 20.*

Circle 263H on Reader Service Card

Flexible Valves

Catalog FL382 covers complete line of pinch-type flexible valves through diagrams and photos. 24 pages.—*Farris Flexible Valve Corp., Palisades Park, N. J.*

Circle 263I on Reader Service Card

Rotary Pumps

Heavy-duty rotary pumps are treated in Bulletin W-483-B2 by diagrams and tables. 16 pages.—*Reciprocating Pump Div., Worthington Corp., Harrison, N. J.*

Circle 263J on Reader Service Card

Cutting Boards

Line of hard maple cutting boards are featured in bulletin.—*Tolerton Co., 265 N. Freedom Ave., Alliance, Ohio.*

Circle 263K on Reader Service Card

Automatic Demineralizers

Diagram and specifications explain advantages of automatic demineralizer.—*Penfield Mfg. Co., Inc., 19 High School Ave., Meriden, Conn.*

Circle 263L on Reader Service Card

Counter Freezer

Folder deals with line of counter freezers with 5 gal. capacity.—*Port Morris Machine & Tool Works, 712 E. 135th St., Bronx 54, N. Y.*

Circle 263M on Reader Service Card

Gear Couplings

Flexible gear couplings are offered in Catalog C4. 16 pages.—*Sier-Bath Gear & Pump Co., Inc., 9252 Hudson Blvd., North Bergen, N. J.*

Circle 263N on Reader Service Card

Heat Exchanger

Efficiency and increased capacity of heat exchanger are explained in Bulletin 2.1K1. 18 pages.—*Ross Heater & Mfg. Co., 1407 W. Ave., Buffalo 13.*

Circle 263O on Reader Service Card

Magnetic Separators

Removal of ferrous materials from bulk materials is treated in Bulletin B-601. 6 pages.—*Eriez Mfg. Co., Erie, Pa.*

Circle 263P on Reader Service Card

Rotating-Disk Valves

Dimensions and illustrations of rotating disk-construction valves is offered in Bulletin 1000. 16 pages.—*Ledeen Mfg. Co., 1600 San Pedro St., Los Angeles 15.*

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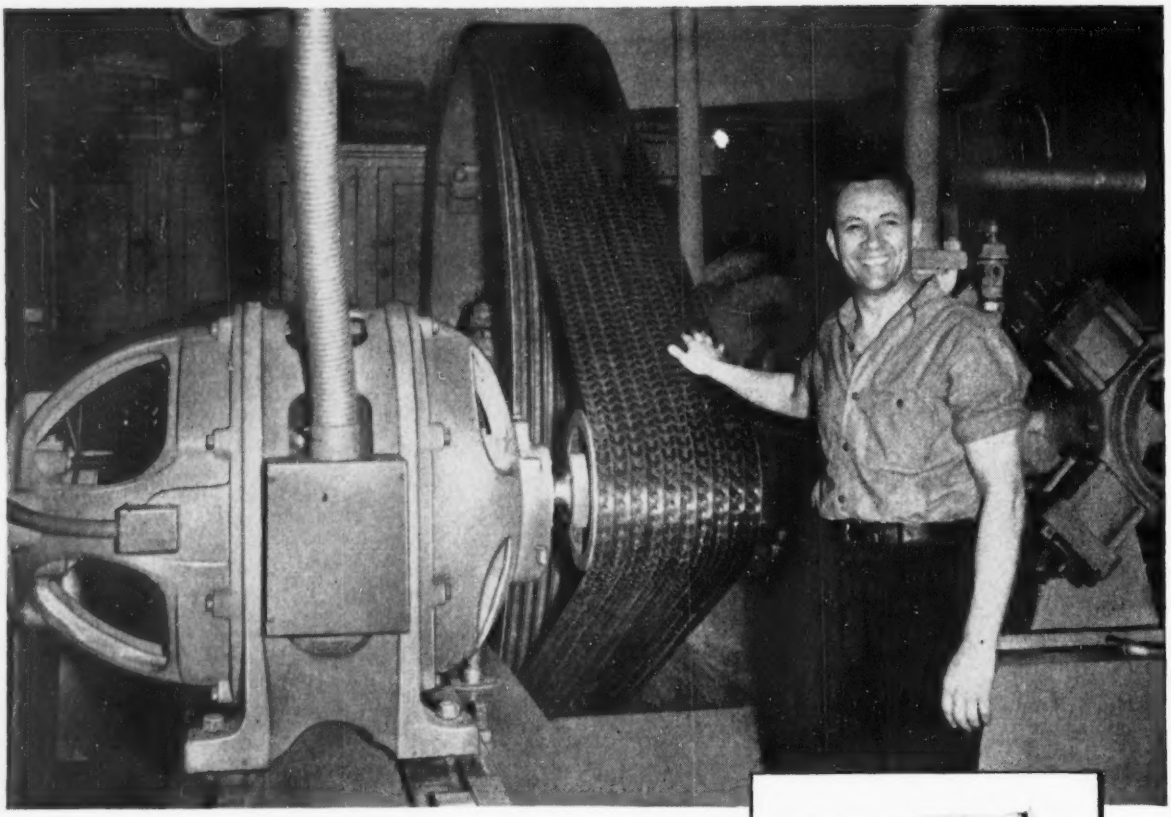

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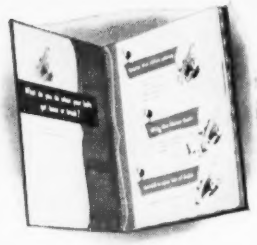

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ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Continuous Feeder

Continuous feeding of non-free-flowing materials is described in booklet.—*Pulva Corp., 550 High St., Perth Amboy, N. J.*

Circle 265A on Reader Service Card

Air Conditioner

Catalog 701 presents line of air handling and conditioning equipment. 28 pages.—*Clarage Fan Co., Kalamazoo, Mich.*

Circle 265B on Reader Service Card

Heating Equipment

Heat exchangers and allied equipment are dealt with in folder. —*Kewanee Ross Corp., 1407 W. Ave., Buffalo 13.*

Circle 263O on Reader Service Card

Circle 265C on Reader Service Card

Extraction Rack

Leaflet explains features of newly designed extraction rack in industry through specifications and photos.—*Labline, Inc., 217 N. Desplaines St., Chicago 6.*

Circle 265D on Reader Service Card

Control Equipment

Solution Control

Bulletin covers electronic, automatic feeding and solution control for bottle washing. 96 pages.—*Diversey Corp., 1820 Roscoe St., Chicago 13.*

Circle 265E on Reader Service Card

Detector System

Electronic system for observing temperature of stored grains is treated in leaflet.—*Hot-Spot Detector Inc., 426 Keo Way, Des Moines.*

Circle 265F on Reader Service Card

pH Meter

Portable pH meter, powered by radio batteries is described in pamphlet.—*Photovold Corp., 95 Madison Ave., New York 16.*

Circle 265G on Reader Service Card

Heating Controls

Line of heating and air conditioning controls is described in leaflet.—*Barber-Colman Co., Rockford, Ill.*

Circle 265H on Reader Service Card

Flow Regulator

Bulletin 521 explains direct acting flow rate regulator, supplying capacity tables and photos.—*W. A. Kates Co., 40 Waukegan Road, Deerfield, Ill.*

Circle 265I on Reader Service Card

Canning Instruments

Complete line of instruments for canning and preserving industries are dealt with in Catalog 500. 46 pages.—*Taylor Instrument Companies, Rochester 1.*

Circle 265J on Reader Service Card

Indicating Thermometers

Folder offers specifications of indicating and recording thermometers. — *Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44.*

Circle 265K on Reader Service Card

Temperature Control

Industrial temperature measurement and control through instrumentation is covered in Bulletin 101. 24 pages.—*Partlow Corp., New Hartford, N. Y.*

Circle 265L on Reader Service Card

Process Piping

Food process piping, engineered for requirements, is dealt with in leaflet.—*Food Equipment & Specialties Co., Wilmette, Ill.*

Circle 265M on Reader Service Card

Liquid Level Controls

Control of liquid level despite temperature or pressure is subject of leaflet.—*Magnetrol Inc., 2110 South Marshall Blvd., Chicago 23.*

Circle 265N on Reader Service Card

Temperature Regulators

Self-operating temperature regulators for steam, liquids, or gases are covered in Bulletin ST162.—*Farris Stacon Corp., Palisades Park, N. J.*

Circle 265O on Reader Service Card

Recorder Controller

Bulletin 465 illustrates restyled circular case controller for automatic control of temperature, pressure, liquid level, or humidity. 16 pages.—*Foxboro Co., Foxboro, Mass.*

Circle 265P on Reader Service Card

Materials Handling

Industrial Elevators

Bulletin 5211 deal with line of industrial elevators and portable cranes, supplying diagrams, photos, and tables. 36 pages.—*Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9.*

Circle 265Q on Reader Service Card

Truck Attachments

Increasing efficiency of powered industrial trucks is covered in booklet. — *Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3.*

Circle 265R on Reader Service Card

Herringbone Gear Drives

Rating tables, and illustrations of herringbone gear drives are offered in Book 2519. 36 pages. —*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle 265S on Reader Service Card

Aluminum Closures

Bulletin covers aluminum closures in food, and associated industries. 28 pages.—*Aluminum Corp. of America, Pittsburgh 19.*

Circle 265T on Reader Service Card

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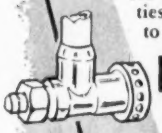
Direct Feed and Remote Feed types adaptable for high side or low side applications. Capacities range from 1 to 1000 tons for "Freon"; 1 to 2000 tons for ammonia.



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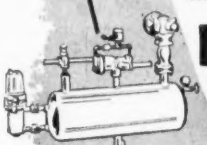

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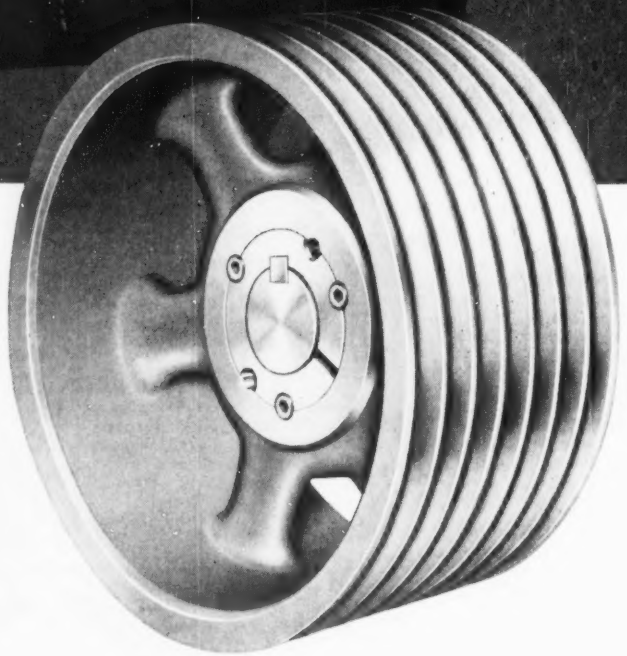

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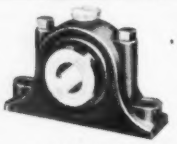

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Loading Device

Load-locking, load-securing device for use in box car loading, is described in bulletin. 24 pages.—*Evans Product Co., Plymouth, Mich.*

Circle 267A on Reader Service Card

Metal Fittings

Bulletin deals with all-purpose fittings for low, medium, and high pressures.—*Chicago Forging & Mfg. Co., 2000 Southport Ave., Chicago 14.*

Circle 267B on Reader Service Card

Fork-lift Truck

Fork-lift truck with capacity of 1000-4000 lbs. is dealt with in pamphlet.—*Crescent Truck Co., Lebanon, Pa.*

Circle 267C on Reader Service Card

Stapling Machine

Manually operated stapler for closing all types of corrugated or fiber cartons is described in leaflet.—*International Staple & Machine Co., 801 Herrin St., Herrin, Ill.*

Circle 267D on Reader Service Card

Industrial Truck

Lightweight industrial truck featuring front wheel steering is explained in folder.—*Kalamazoo Mfg. Co., Kalamazoo, Mich.*

Circle 267E on Reader Service Card

Curved Conveyors

Truck and boxcar loading with curved conveyor system is dealt with in pamphlet.—*Power-Curve Conveyor Co., P. O. Box 1146, Denver.*

Circle 267F on Reader Service Card

Pallet Roller

Leaflet describes advantages of pallet roller for use on slatted decks.—*Frank L. Robinson Co., Latham Square Bldg., Oakland 12, Calif.*

Circle 267G on Reader Service Card

Screw Conveyor

Book 2289 offers detailed technical information on screw conveyors and screw feeders. 92 pages.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle 267H on Reader Service Card

Belt Conveyor

Tables and photos explain features of belt conveyor in leaflet.—*Rapids-Standard Co., Inc., Grand Rapids 2.*

Circle 2671 on Reader Service Card

Belt Conveyors

Catalog 852 deals with line of belt conveyors, offering photos, technical data, maintenance information, specifications. 90 pages.—*Jeffrey Mfg. Co., Columbus 16, Ohio.*

Circle 267J on Reader Service Card

Spray Nozzles

Atomizing nozzles, spray nozzles, and spray nozzle clusters are treated in Bulletin 6-A, via charts, drawings, photos, and tables. 20 pages.—*Schutte & Koerting Co., Cornwell Heights, Pa.*

Circle 267K on Reader Service Card

Wire Cloth

Industrial use of wire cloth is treated in folder.—*Cambridge Wire Cloth Co., Cambridge, Md.*

Circle 267L on Reader Service Card

Plant Supplies

Prefab Buildings

Bulletin described production and function of prefabricated steel buildings, presenting charts, photos and diagrams. 24 pages.—*Soule Steel Co., 1750 Army St., San Francisco 24.*

Circle 267M on Reader Service Card

Caulking Compound

Synthetic rubber caulking compound for construction, maintenance and product finishing is dealt with in leaflet.—*Del Protective Coatings, 220 E. 42nd St., New York 17.*

Circle 267N on Reader Service Card

Industrial Flavors

Flavor formulas, charts, and suggestions for manufacturing and professional use of flavors are contained in bulletin. 28 pages.—*Dodge & Olcott, Inc., 180 Varick St., New York 14.*

Circle 267O on Reader Service Card

Synthetic Methanol

Specifications, uses and properties of synthetic methanol are covered in booklet. 30 pages.—*Commercial Solvents Corp., 260 Madison Ave., New York 16.*

Circle 267P on Reader Service Card

Heating Devices

Electric heaters and heating devices are featured in Catalog GEC-1005D. 60 pages.—*General Electric Co., Schenectady 5, N. Y.*

Circle 267Q on Reader Service Card

Anti-Corrosion Roofing

Bulletin 9-1 offers tables and photographs of new type of corrosion-proof construction material. 16 pages.—*Atlas Mineral Products Co., Mertztown, Pa.*

Circle 267R on Reader Service Card

Sheet Fabrication

Brochure illustrates line of galvanized and black sheet steel, varying in alloy and thickness. 40 pages.—*Kirk & Blum Mfg. Co., Cincinnati 9.*

Circle 267S on Reader Service Card

Instrument Tubing

Corrosion-proof tubing is subject of Bulletin L-6506.—*Samuel Moore & Co., Dekron Tubing Div., Mantua, Ohio.*

Circle 267T on Reader Service Card

Foam Insulation

Booklet covers advantages of new plastic foam insulation. 8

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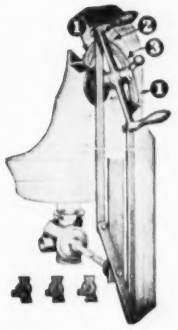

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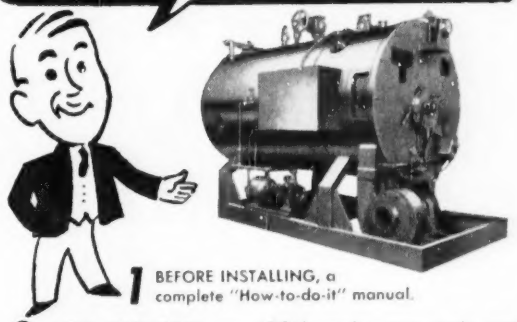

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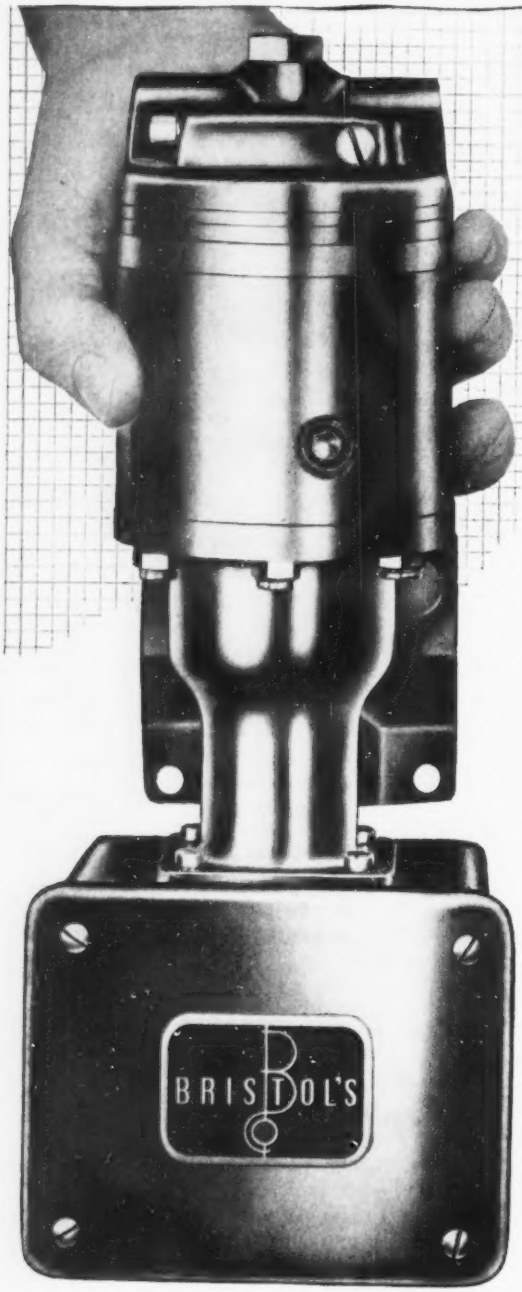

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pages.—*Colton Chemical Co., Colfoam Div., Cleveland 14.*

Circle 269A on Reader Service Card

Drainage Products

Line of plumbing drainage products is covered in Catalog K. 240 pages.—*Josam Mfg. Co., Michigan City, Ind.*

Circle 269B on Reader Service Card

Lightweight Hose

Three new types of spiral wire reinforced flexible hose are dealt with in Catalog 35.—*American Ventilating Hose Co., 100 Park Ave., New York.*

Circle 269C on Reader Service Card

Plastic Diglycerides

Use of plastic diglycerides in bakery is discussed in Bulletin 35. —*Emulsol Corp., 59 East Madison St., Chicago 3.*

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Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—page 213. Then sign at the bottom and mail.

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Ventillating Units

Exhausters for wall or roof application are subject of Bulletin 50A.—*Jenn-Air Exhausters, Architects Bldg., 333 N. Pennsylvania St., Indianapolis 4.*

Circle 269E on Reader Service Card

Miscellaneous

Sound Control

Fiberglas sound control products for use in industrial plants are discussed in two booklets.—*Owens-Corning Fiberglas Corp., Toledo 1, Ohio.*

Circle 269F on Reader Service Card

Power Distribution

Bulletin GEA-5900 is guide on electric power distribution for plant engineers of large or small plants. 28 pages.—*General Electric Co., Schenectady 5, N. Y.*

Circle 269G on Reader Service Card

Spring-lock Fasteners

Industrial adaptability of wide range of spring-lock fasteners is featured in Catalog 1252. 38 pages.—*Simmons Fastener Corp., N. Broadway, Albany 1.*

Circle 269H on Reader Service Card

Sauerkraut Salinity

Booklet contains test cards for effective reading of amount of salt in sauerkraut.—*Morton Salt Co., 120 S. LaSalle St., Chicago 3.*

Circle 269I on Reader Service Card

Steel Shelving

Steel shelving, lockers, and other storage and maintenance equipment for industry are treated in catalog. 32 pages.—*Precision Equipment Co., 3704 North Milwaukee Ave., Chicago 41.*

Circle 269J on Reader Service Card

Tape Dispensers

Line of taping machines and dispensers are subject of leaflet.—*Minnesota Mining & Mfg. Co., St. Paul.*

Circle 269K on Reader Service Card

Protective Shields

Leaflet deals with face shield protective products. — *Pulmosan Safety Equipment Corp., 644 Pacific St., Brooklyn 17.*

Circle 269L on Reader Service Card

Production Estimates

Synthetic organic chemical production in '55 and '75 is discussed through tables and text in booklet. —*R. S. Aries & Assoc., 400 Madison Ave., New York 17.*

Circle 269M on Reader Service Card

Offset Reproduction

Methods and equipment necessary to prepare and produce offset reproduction are discussed in folder.—*Remington Rand Inc., 315 Fourth Ave., New York 10.*

Circle 269N on Reader Service Card

Technical Charts

Production of technical charts for recording instruments in industry is covered in brochure. 12 pages.—*Technical Charts Inc., Buffalo 10.*

Circle 269O on Reader Service Card

Electric Scraper

New butcher block electric scraper is described in pamphlet. —*Steelsharp Mfg. Co., Racine, Wis.*

Circle 269P on Reader Service Card

Credit References

Reference book for business credit ratings is described in release.—*Dun & Bradstreet, Inc., 99 Church St., New York.*

Circle 269Q on Reader Service Card

Industrial Incinerators

Leaflet describes new commercial and industrial incinerator that burns wet or dry refuse.—*Winnen Incinerator Co., Bedford, Ohio.*

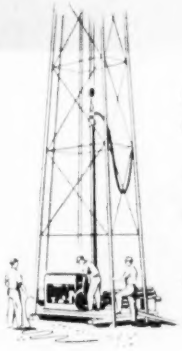
Circle 269R on Reader Service Card

Lab Equipment

Catalog treats line of laboratory equipment through photos, tables. 16 pages.—*Scientific Glass Apparatus Co., Inc., 100 Likewood Terrace, Bloomfield, N. J.*

Circle 269S on Reader Service Card

How Layne assures your water supply



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"He never was much for letter-writing when he was in college. But he must know how anxious Mother and I are . . . now that he's off in Korea. Haven't heard from him in six weeks. Of course, they say 'no news is good news' . . . but I wonder. Maybe he can't write . . . because . . . maybe he's in a hospital somewhere. And maybe he needs blood. I don't know . . . but I'm not taking any chances. That's why *I'm* giving blood."

★ ★ ★

Yes, all kinds of people give blood—for all kinds of reasons. But whatever *your* reason, this you can be sure of: Whether your blood goes to a combat area, a local hospital, or for Civil Defense needs—this priceless, painless gift will some day save an American life!

Give Blood Now

CALL YOUR RED CROSS TODAY!

NATIONAL BLOOD PROGRAM

Business Executives! ✓Check These Questions!

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ☐ Have you given your employees time off to make blood donations?
- ☐ Has your company given any recognition to donors?
- ☐ Do you have a Blood Donor Honor Roll in your company?
- ☐ Have you arranged to have a Bloodmobile make regular visits?
- ☐ Has your management endorsed the local Blood Donor Program?
- ☐ Have you informed employees of your company's plan of cooperation?
- ☐ Was information given through Plant Bulletin or House Magazine?
- ☐ Have you conducted a Donor Pledge Campaign in your company?
- ☐ Have you set up a list of volunteers so that efficient plans can be made for scheduling donors?

Remember, as long as a *single* pint of blood may mean the difference between life and death for *any* American . . . the need for blood is *urgent!*

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Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!
NUTRITIONAL RESEARCH ASSOCIATES
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FOOD ENGINEERING
330 W. 42nd St., New York 36, N. Y.

If **this or other advertising does not supply the information wanted concerning ingredients for the food processor, please write:**
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REPLIES (Box No.): Address to office nearest you
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- Colton 2, 3 Rotary Tablet Machines.
- Pony M, ML Labelrites; Ermold, World semi, fully automatic Labelers.
- Stokes & Smith Transwrap Filler.
- S. & S. G1, G2 and G6 Auger Fillers.
- F. J. Stokes HG88 Duplex Auger Filler.
- Whiz Packer and Triangle Fillers.
- Triangle Package Models, G2C, G2S, N2CA Elec-Tri-Pak Fillers.
- Horix and Elgin S. S. Rotary Fillers.
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- Doughboy, Amsco Rotary Bag Sealers.
- Standard-Knapp No. 429 Carton Sealer.
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- Hayssen; Package Machy. Co. FA, FA4, DF, CA2; Miller and Scandia automatic cellophane Wrappers.
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Starch Coolers: 100 gal. stain. steel, 20 psi.
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100 gal. S.S. Clad Jkt. Kettles, 30"x32".
150 gal. S.S. Jkt. Kettle, 42"x34", agit.
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75 to 1500 gal. Homogenizers or Viscolizers.
Model 148C Stokes Vacuum Pump, 1½" H.P.
Hobart Grinder, 1½ H.P.
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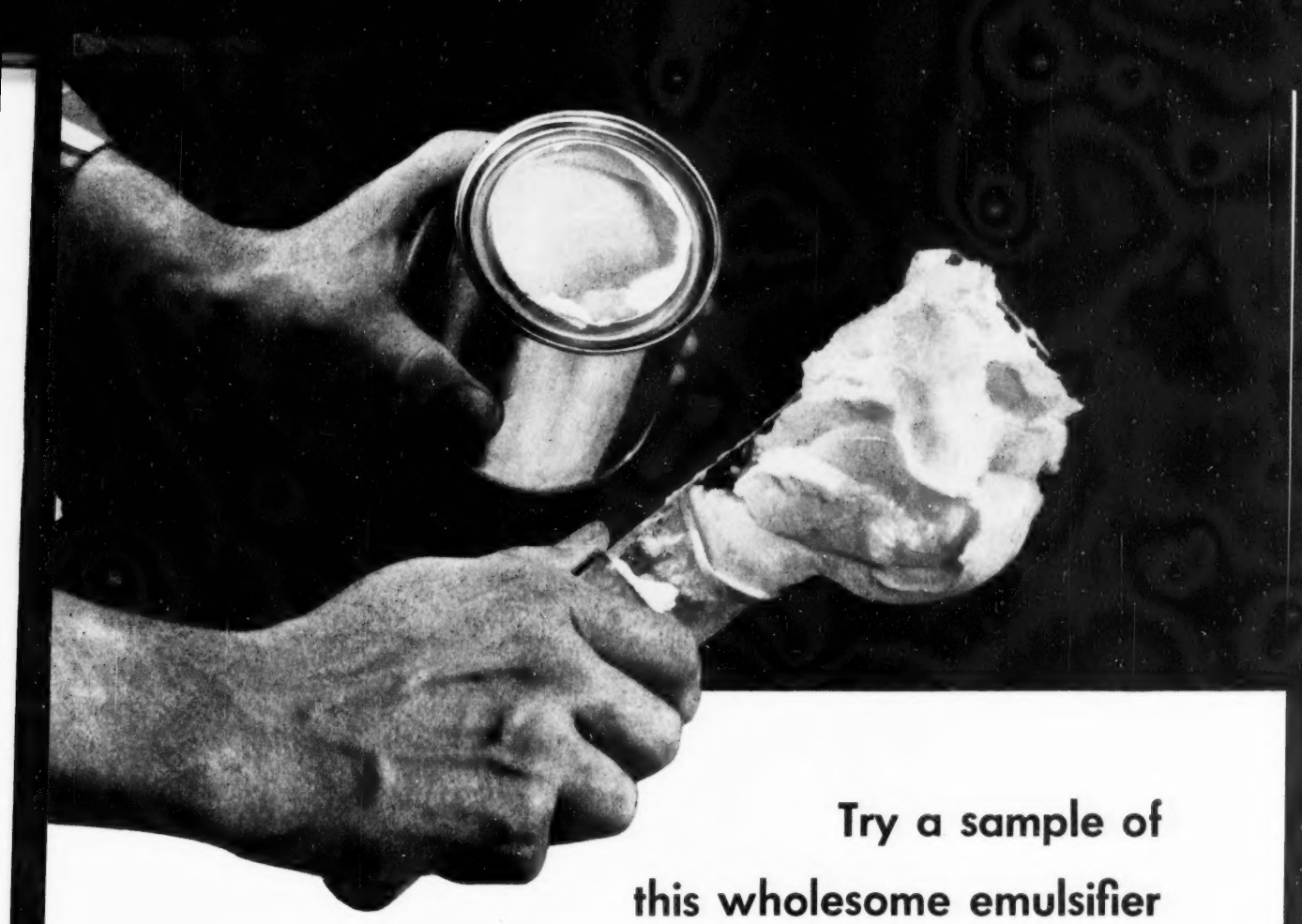

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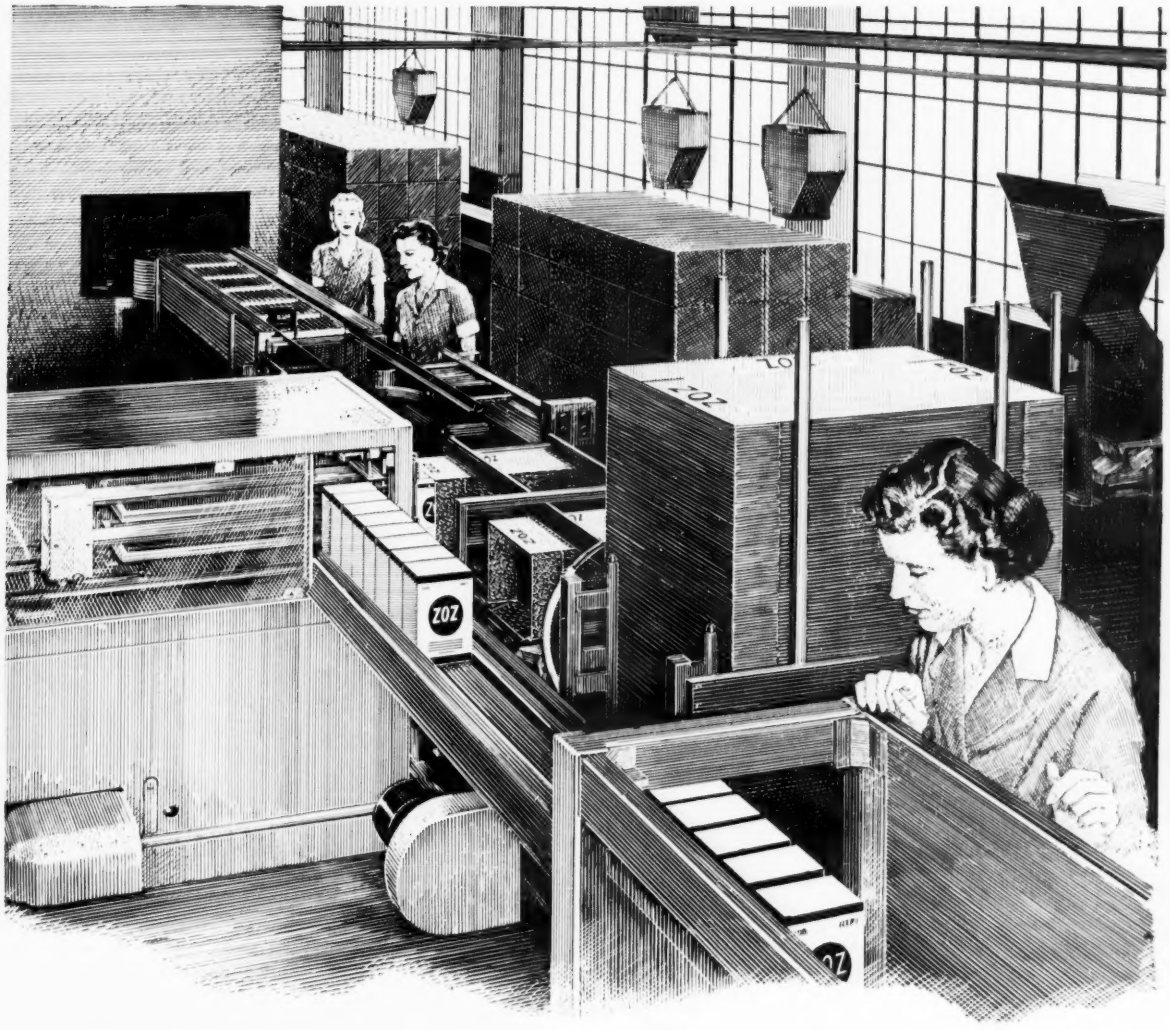

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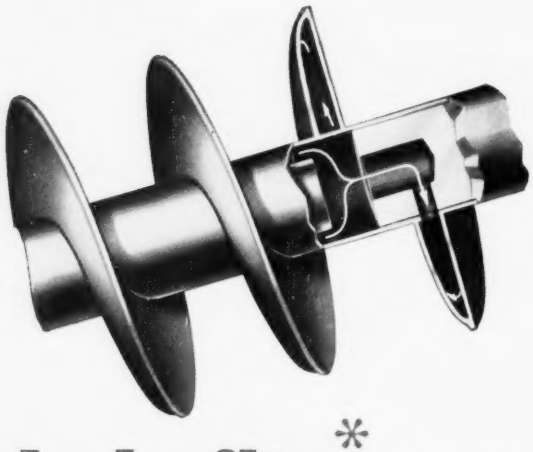

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A simpler, more compact way to cool slurries, solids or pastes—in continuous flow!

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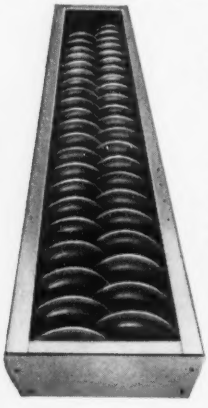
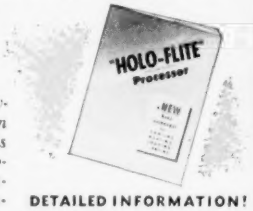


what IT IS!

Basically the HOLO-FLITE consists of two or more flights of hollow-bladed screw conveyors. The product to be processed moves in a trough around the conveyor screws. The heat-transfer fluid circulates through the hollow blades and shafts of the conveyor. The product is constantly rotated into, around, under and over the blades and shafts through which the heat-transfer fluid is circulating, assuring quick, uniform heat passage between the two mediums—*as the product is continuously moved along in a bulk-flow without interruptions!*

Get the complete story on HOLO-FLITE *savings and how this new advancement can simplify your processing operations. It is backed by the same organization that pioneered* COTTRELL *Precipitators and* MULTICLONE *Collectors—your assurance of complete dependability.*

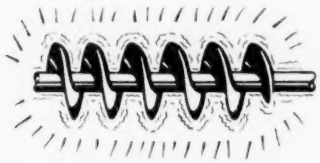


DETAILED INFORMATION!
New 8 page bulletin describing HOLO-FLITE features and applications will gladly be sent on request. Write, wire or phone for your free copy!

*Reg. T.M.

why IT'S BETTER!

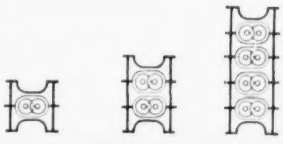
The HOLO-FLITE principle provides many important advantages in modern processing operations...



ITS LARGE HEAT-TRANSFER SURFACE requires far less space—as little as 1/5th the space required by other heat-exchange equipment. Further, flights can be "stacked" as high as desired to save floor space, simplify installation!

ITS SLOW ROTATION IS SO GENTLE that granular and powdered solids are handled with no dusting—little or no particle abrasion. Result—no dust recovery problems . . . simple, inexpensive installation.

IT IS ADAPTABLE to a wide range of applications—handles solids, pulps, pastes and slurries with equal ease. Heat transfer agent can be refrigerant, water or other fluids to provide a wide range of temperatures. Cooled products can be packed directly from HOLO-FLITE discharge, saving time, space and additional handling.



IT CAN BE DESIGNED to handle virtually any capacity by varying the diameter and length of the flights, and the number of "tiers."

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